EOSDIS TEST VERSION
COMPONENT ACCEPTANCE TEST PLAN
FOR
ECS IR-1

Baseline
(Deliverable 1003 Task 10C)

November 3, 1995

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EXECUTIVE SUMMARY

The Component Acceptance Test Plan is a Level Three document that presents the government acceptance test plan for the Interim Release One (IR-1) of the Earth Observing System Data Information System (EOSDIS) Core System (ECS) under the auspices of the Earth Science Data and Information System (ESDIS) Project Systems Management Office (SMO). The program described in this document is performed under the direction of the ESDIS Independent Verification and Validation (IV&V) Manager.

This plan describes the overall structure for the testing of ECS IR-1 and provides a brief system overview and schedule. For each test identified in the overview, a detailed test description is provided. The test procedures are developed directly from the detailed test descriptions contained within this document.

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TABLE OF EXHIBITS

1.0 INTRODUCTION

1.1 Purpose and Scope

The purpose of this document is to identify the specific test plan for the Component Acceptance Test (AT) of the ECS IR-1, directed by the ESDIS IV&V manager. Component AT verifies the Level 3 (L3) requirements assigned to IR-1. Component AT precedes the ESDIS Integration and Test (I&T) Program as defined in the Earth Observing System (EOS) Ground System (EGS) Integration, Test & Validation Plan (EITVP). Specific goals for this test plan are as follows:

- Present an overview of the capabilities being tested, including identification of applicable configuration items.
- Provide an overall schedule of test activities.
- Provide descriptions of tests to be executed during acceptance testing.
- Provide high level test sequences for the applicable sites.
- Allocate tests to test sites and provide high level test execution sequences.
- Provide additional information regarding test data, personnel, tools, and other related topics.

1.2 Content

The Component AT Plan is divided into four sections and two appendices:

- Section 1 provides introductory material.

- Section 2 provides the IR-1 release overview. The required capabilities and a block diagram of the components of the release are included.

- Section 3 provides an overview of the Component AT program for this release. Details include master schedule mapping, test execution order dependencies, the specific AT schedule, and test prioritization.

- Section 4 contains the actual test descriptions. For each test, the objectives, requirements verified, the test configuration, and the test execution support requirements are identified. Then, individual test cases are described for each test.

- Appendix A provides a matrix of ECS Level 3 Requirements by Release for IR-1 to AT tests.

- Appendix B contains an acronym and abbreviation list.

1.3 Applicable Documents

The following documents are the parents from which this document derives its scope and content:

EOSVV-1005   EOS Ground System (EGS) Integration, Test & Validation Plan (EITVP) Baseline, 6/30/95.

EOSVV-1002   Component Acceptance Master Test Plan, Baseline, 10/6/95.

Baseline   EOS Ground System Integration and Test Philosophy, 3/95.
          EOS Ground System Integration & Test Schedules, 8/95.

The following documents and materials were used in preparing the document.

209-CD-007-002   Interface Control Document Between EOSDIS Core System (ECS) and TRMM Science Data and Information System (TSDIS), 7/95.

209-CD-008-001   Interface Control Document Between EOSDIS Core System (ECS) and the Goddard Space Flight Center (GSFC) Distributed Active Archive Center (DAAC) for the ECS Project.

209-CD-009-002   Interface Control Document Between EOSDIS Core System (ECS) and the Marshall Space Flight Center (MSFC) Distributed Active Archive Center (DAAC) for the ECS Project, 7/95.

222-TP-003-006   Release Plan Content Description for the ECS Project, 5/95.

222-WP-001-002   Mission Statement for Interim Release One for the ECS Project, 8/95.

RTM   Level 3 and Level 4 Requirements form the RTM database, both CDR Baseline version (2/AUG/95) and subsequent release (18/SEP/95).

(307-CD-002-002   Science Data Processing Segment (SDPS) Release and Development Plan
329-CD-002-002)   for the ECS Project, 3/95.

(307-CD-003-003   Communications and Systems Management Segment (CSMS) Release
329-CD-003-003)   and Development Plan for the ECS Project, 6/95.

319-CD-002-002   Science Data Processing Segment (SDPS) Integration and Test Plan for the ECS Project: Volume 1: IR-1, 3/95.

319-CD-003-003   Communications and Systems Management Segment (CSMS) Integration and Test Plan, Volume 1: IR-1, 6/95.

(322-CD-001-001   Interim Release 1 Integration and Test Plan and Procedures for the ECS
414-CD-001-001)   Project, 8/95.

402-CD-001-002   System Integration and Test Plan - Volume 1: Interim Release 1 (IR-1) for
                   the ECS Project, 2/95.

423-41-02   Functional and Performance Requirements Specification for the ECS-
                   CH012, 7/95.

604-CD-001-004   ECS Operations Concept for the ECS Project: Part 1 - ECS Overview,
                   6/95.

800-TP-001-001   IR-1 Installation Plan for the ECS Project, Technical Paper, 8/95.

2.0 ECS IR-1 OVERVIEW

This section provides an overview of the capabilities being provided by ECS IR-1. It provides sections describing the major objectives of this release along with a summary of the configuration items expected to be installed. Some of the detailed capabilities have been listed in this section for reference purposes only since not all detailed functionality will be tested during component acceptance testing. Specific functionality to be tested is described in Section 4.

2.1 Required Capabilities

The ECS IR-1 System will be deployed at four of the Distributed Active Archive Centers (DAACs): Goddard Space Flight Center (GSFC), Langley Research Center (LaRC), Marshall Space Flight Center (MSFC), and the EROS Data Center (EDC). There are no TRMM specific requirements for the EDC DAAC, thus generic functionality and no ingest capability will be installed at that site. In addition, limited System Monitoring and Coordination center (SMC) functionality will be deployed at the ECS Development Facility (EDF) for this release. In the context of this plan, all references to SMC refer to the functionality at the EDF. The system represents an incremental release leading to ECS Release A. IR-1 has the primary objectives of :

- Supporting Science Software Integration and Test (SSI&T), and
- Supporting early TRMM interface testing
- Provide an infrastructure of basic hardware and system software that will be reused in Release A.

The introduction of IR-1 is intended to reduce overall ECS schedule risk.

2.1.1 Science Software Integration and Test

The ECS IR-1 provides an environment for the early integration and testing of science software from the EOS AM-1 Instrument Teams (ITs) and TRMM's CERES and LIS ITs. Early SSI&T gives the ITs and DAAC personnel insight into the portability of the science software within the initial staging of the ECS environment. The following tools are provided to support the SSI&T capabilities:

- SCF and DAAC versions of SDP Toolkit
- Compilers: C, C++, FORTRAN 77 and 90, Ada (LaRC only)
- File comparison utility
- Static and dynamic code checkers for standards compliance
- Profiling tools for resource monitoring
- Product visualization/graphics tool
- Document viewing tools
- Math, graphics, and statistics libraries
- Software configuration management tool.

2.1.2 TRMM Interface Testing

Once fully integrated, the ECS IR-1 will provide capabilities for early functional testing of TRMM-ECS interfaces among several facilities including the Sensor Data Processing Facility (SDPF), the TRMM Science Data and Information Systems (TSDIS), NOAA/NESDIS, the Data Assimilation Office (DAO), and three DAACs - LaRC, GSFC, and MSFC. The system will support testing of an automated network ingest interface with SDPF and TSDIS to include the exchange of security authentication messages. IR-1 will also support testing of the polling ingest interface with NESDIS and DAO. The IR-1 ingest interface will perform format verification on incoming data.

The scope of TRMM interface testing during Component AT activities will be restricted to the functionality associated with the ECS portions of the interfaces. Interface testing to external entities will be simulated during ECS IR-1 component testing through the use of simulators and other tools. Actual interfaces will be tested, as they become available, during EGS System Integration and Test activities.

2.1.3 System Infrastructure

Several other capabilities are also included in the ECS IR-1, as listed below:

- Data Server Interface - provides the capability to support the testing of the Data Server interface for sending and receiving data to and from TSDIS.

- Planning and Processing - provides basic capabilities for managing science data processing tasks. It supports manual capabilities for generating processing plans and for process initiation and control. This capability also supports process execution profiling and diagnostic reporting on 32-bit and 64-bit architectures.

- Communication and Management Infrastructure -
  1. Basic naming and directory, time, thread and security services (DCE-based).
  2. File transfer protocol (ftp), email, bulletin board, event logger, virtual terminal (telnet and X).
  3. EDF-based framework for fault and performance management, event logging, network discovery and monitoring.
  4. Site-based COTS, SNMP agents for hosts and, as provided, for V0 network components.
  5. Authentication (DCE account management), authorization (host-level account management), router-based security (address table management).
  6. Configuration management tools for science software (at the DAACs) and development software at the EDF.

2.2 The ECS IR-1

Exhibit 2-1 lists the IR-1 configuration items. The two segments of IR-1 (Communications and Systems Management (CSMS) and Science Data Processing Segment (SDPS)) are each divided into subsystems. These subsystems are then divided into Computer Software Configuration Item (CSCI) and Hardware Configuration Item (HWCI). The last column in the exhibit lists the service or specific hardware provided by the configuration item (CI).

Exhibit 2-2 lists the EDF and DAAC site specific hardware for IR-1. Hardware supporting the SSI&T and Ingest functions are defined.

SEGMENT	SUBSYSTEM	CSCI/HWCI	Service
CSMS	Communications (CSS)	Distributed Computing Software (DCCI)	File Access Service, Message Passing, Time Service, Event Logger Service, Electronic Mail Service, Virtual Terminal Service, Bulletin Board, Dev. Support, Thread Service, Directory /Naming Service, Security Service
		Distributed Computing Hardware (DCHCI)	Enterprise Comm Server, Bulletin Board Server, Printers
	Internetworking (ISS)	Internetworking (INCI)	Transport, Network, Data Link/Physical
		Internetworking Hardware (INHCI)	Low-end Ethernet Hub, Ethernet Cabling
	Management (MSS)	Management Software (MCI)	Accountability Mgt: User Registration, Security Management for IR-1, Maps & Collections, Mgmt. Framework (Monitoring, Discovery), Fault Management for IR-1, Performance Management for IR-1, Mgmt. User I/F, DBMS, Startup & Shutdown, OA Tools
		Management Agents (MACI)	Management Agents
		Management Logistics (MLCI)	Configuration Management
		Management Hardware (MHCI)	Local Mgmt. Server, Enterprise Mgmt. Server, Mgmt. Workstation
SDPS	Data Proc. (DPS)	Processing CSCI (PRONG)	Processing Queue Management
		Science Data Processing (SDP) Toolkit (SDPTK)	Status Message Facility Tools, Process Control Tools, File I/O Tools, Coordinate System Conversion Tools, Celestial Body Position Tools, Constant and Unit Conversion Tools, Geo-Coordinate Transformation Tools, Ancillary Data Access Tools, Memory Management Tools, Time and Date Conversions, Spacecraft Ephemeris and Attitude Access Tools, Metadata Access Tools, Math Tools (IMSL), Graphics Tools, HDF-EOS
		Algorithm Integration and Test CSCI (AITTL)	Documentation Viewing Tools, Standards Checkers, File Comparison Utility, Profiling Tools, Report Generation Tools
		Science Processing HWCI (SPRHW)	SMP Science Processor (Uniprocessor Science Workstation at MSFC), RAID Disk, OPS W/S
		Algorithm Integration and Test HWCI (AITHW)	OPS W/S
	Ingest (INS)	Ingest CSCI (INGST)	Automated Network Ingest Client Interface
		Ingest Client HWCI (ICLHW)	Ingest Server Host W/S, RAID Disk (No ingest hardware at EDC for IR-1)

EXHIBIT 2-1: IR-1 Configuration Items

Workstation or Peripheral	Technical Specifications	ALLOCATION				
		EDC	LaRC	GSFC	MSFC	SMC[1]
MSS Server	SUN Sparc 20/50 MB RAM / GB disk	1 64/2	1 64/2	1 128/4	1 64/2	
MSS Server	HP755 w/ 5 GB disk					1
CSS Server	HP755 w/ 5 GB RAID					1
AI&T Server	SGI Power Challenge XL CPU / MB RAM / GB disk	1 2/256/4.3	1 4/512/4.3	1 6/2048/4.3		1 2/TBD/TBD
AI&T Server	SGI Indigo MB RAM / GB disk				1 256/4	1 TBD/TBD
Ingest Server	SGI Indigo2 MB RAM / GB disk		1 TBD/TBD	1 TBD/TBD	1 128/6	1 TBD/TBD
AI&T Client W/S	SUN Sparc 20/50 MB RAM / GB disk MB RAM / GB disk	2 64/2 128/4	2 64/2 128/4	2 64/2 128/4	2 64/2 128/4	1 TBD TBD
RAID		29[2] and 35 GB	68 GB	45 and 30 GB		30 GB
CD ROM		1	2	2	2	2
8mm Tape w/ Stacker		1	2	2	2	2
Laser Printers	via Network connection	2	2	2	2	2

(1) Limited SMC functionality at EDF.

(2) SUN disk

EXHIBIT 2-2: ECS IR-1 Site Specific Hardware

The exhibit above most closely reflects the information in the Mission Statement for Interim Release One for the ECS Project (August 1995) and the IR-1 Installation Plan for the ECS Project (August 1995).

3.0 IR-1 COMPONENT ACCEPTANCE TEST PROGRAM OVERVIEW

This section provides the framework for IR-1 AT activities. It provides schedules and ancillary information for conducting the planned tests. Although the format of this section differs from the standard provided in the Component Acceptance Master Test Plan (EOSVV-1002), the sections do contain the information required by the referenced plan. Exhibit 3-1 provides a summary of the contents in this section as they relate with one another.
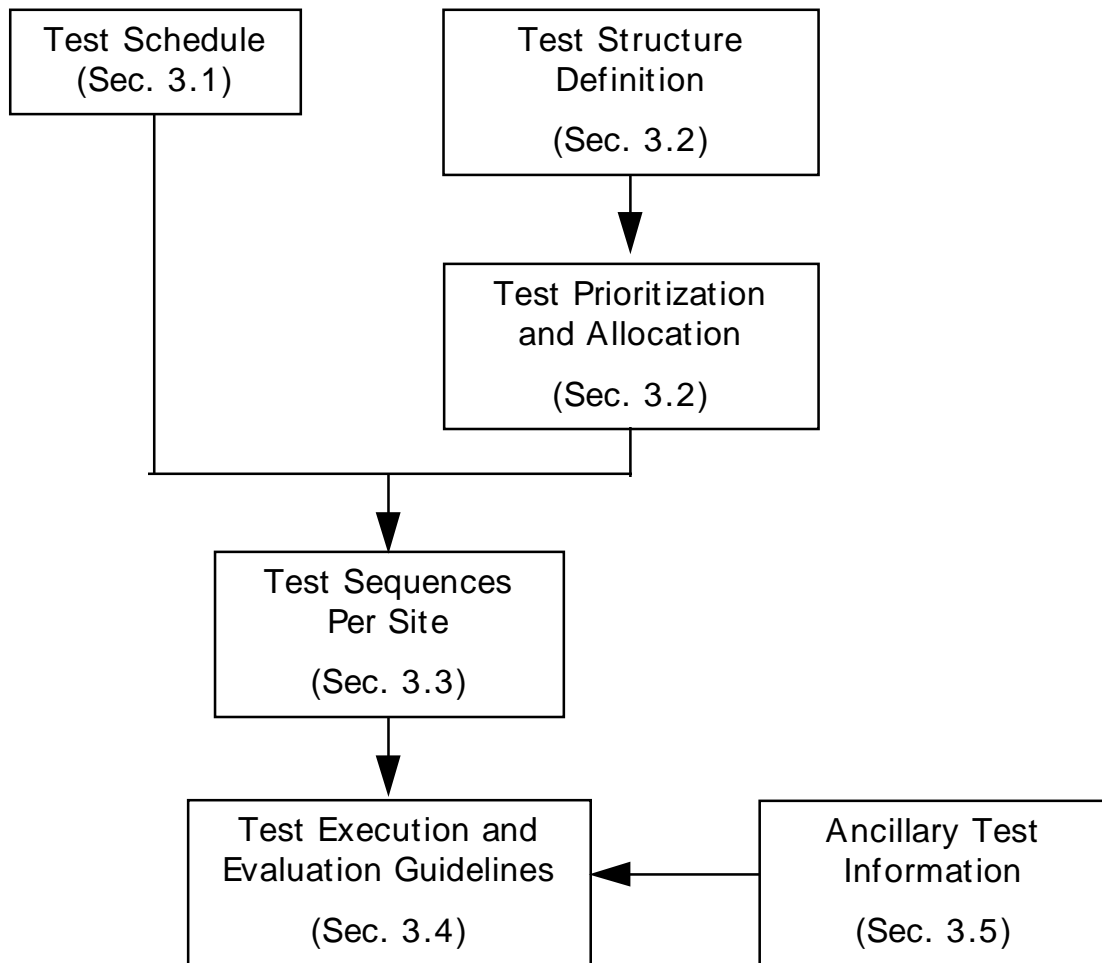
EXHIBIT 3-1: Test Planning Overview

3.1 Major Schedule Milestones for IR-1 AT

ESDIS/SMO has scheduled component acceptance testing of ECS IR-1 from February 1, 1996 to February 29, 1996. Within that period, test windows are allocated for activities at each of the participating DAACs. Exhibit 3-2 provides a timeline of events including SMO schedule data along with related milestones associated with test documentation and preparatory meetings.

ACTIVITY	SCHEDULE DEPENDENCY	PLANNED DATE
Acceptance Test Plan for ECS IR-1 (Review)	Per Task Order	13 OCT 95
Acceptance Test Plan for ECS IR-1 (Baseline)	Per Task Order	3 NOV 95
Issue Request for DAAC Support Messages	Test Start - 60d	1 DEC 95
Acceptance Test Procedures for ECS IR-1 (Review)	Per Task Order	15 DEC 95
Test Procedures Dry Run #1 (IV&V Only)	Internal	18-20 DEC 95
Test Readiness Review (TRR)	Test Start - 30d	5 JAN 96
Test Procedures Dry Run #2 (IV&V Only)	Internal	10-11 JAN 96
Acceptance Test Procedures for ECS IR-1 (Final)	Per Task Order	15 JAN 96
Final Test Coordination Meeting	Test Start - 7d	25 JAN 96
Test Procedures Dry Run #3 (IV&V Only)	Internal	29-30 JAN 96
Start of ECS IR-1 Acceptance Testing	Test Start	1 FEB 96
GSFC DAAC and SMC Test Activities		1-22 FEB 96
LaRC DAAC Test Activities		1-14 FEB 96
MSFC DAAC Test Activities		15-29 FEB 96
EDC DAAC Test Activities		23-29 FEB 96
Completion of ECS IR-1 Test Activities	Test Completion	29 FEB 96
Flash Test Summary Report	Test Completion + 7d	8 MAR 96
Final Test Report	Test Completion + 45d	15 APR 95

EXHIBIT 3-2: Major ECS IR-1 Component Acceptance Testing Milestones

3.2 Test Structure and Allocation

A goal of component acceptance testing is to verify Level 3 requirements. Exhibit 3-3 provides an overview of the test structure. Review of IR-1 documentation resulted in the generation of tests to be executed during ECS IR-1 acceptance to verify that the system meets the functionality contained in the allocated requirements. These tests are defined under the categories defined in the Component Acceptance Master Test Plan and shown in Exhibit 3-4.
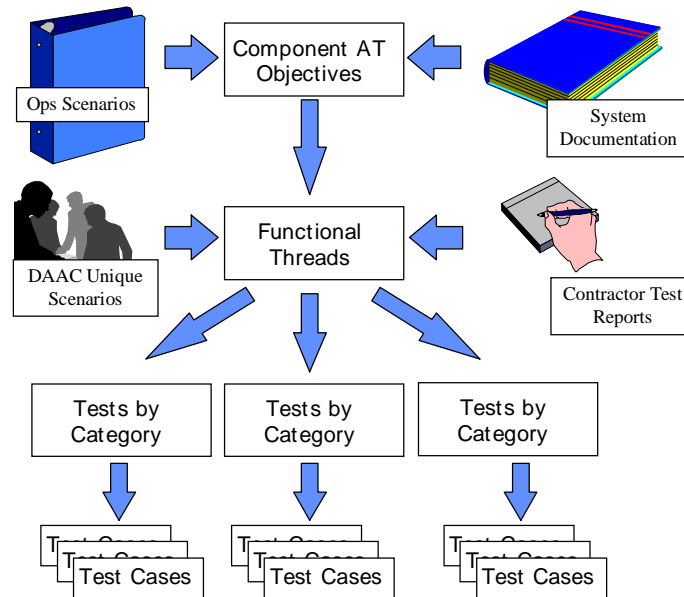
EXHIBIT 3-3: Overall Test Structure
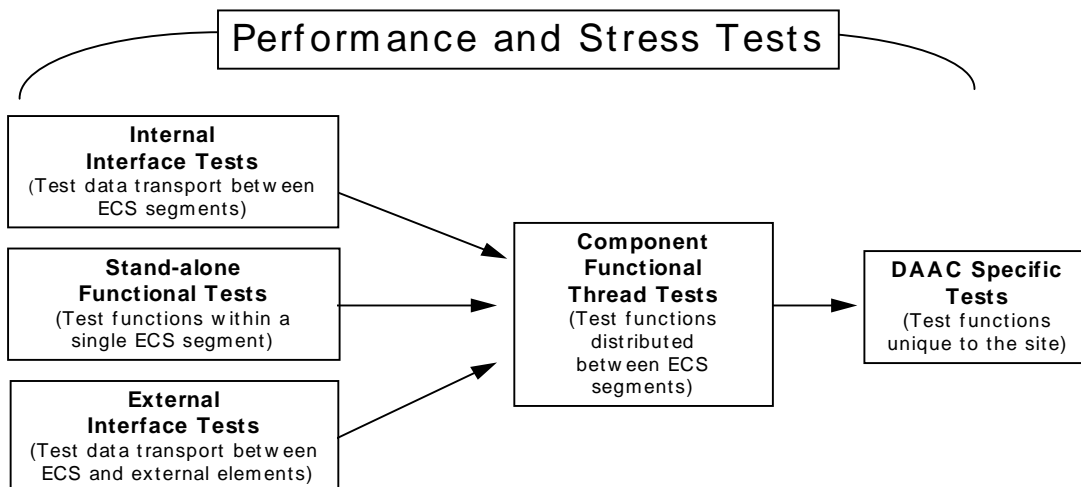
EXHIBIT 3-4: Available Test Categories for Component Acceptance Tests

Exhibit 3-5 lists the defined tests, the number of allocated L3 requirements, and the derived test priority. The criticality of some mission essential requirements changes to mission critical for ECS Release A. The number of requirements with dual criticality has been highlighted for planning purposes, since it can help focus on the tests addressing the transition from IR-1 to Release A. The priority ratings assigned to the tests can range from 1 (High Priority) to 3 (Low Criticality). These ratings are defined in the Component Acceptance Master Test Plan. The requirements for test EXT04 are still under review since there are some discrepancies between the ECS Integration and Test procedures and the generated RTM reports.

Test ID	Title	L3 Requirement Criticality			Test Priority
		Mission Essential		Mission Fulfillment	
		IR-1	Critical in Rel. A		
Component Functional Thread Tests (CFT)					
CFT01	Science Software Integration and Operations	35	1	2	1
CFT02	Science Product Generation and Distribution	9			2
External Interface Tests (EXT)					
EXT01	TRMM Level 0 Data Ingest	8	1	1	1
EXT02	TRMM Data Product Ingest	10	1	1	1
EXT03	NOAA and Non-EOS Ancillary Data Ingest	3		1	1
EXT04	Data Product and Ancillary Data Distribution to TSDIS	**TBD**		**TBD**	**TBD**
Internal Interface Tests (INT)					
INT01	System Deployment Verification	2	1		1
INT02	System Test Support Capability	1		1	2
Stand-Alone Functional Tests (SFT)					
SFT01	Network Operations and Monitoring	17	8		1
SFT02	System Operations and Administration	15	6		1
SFT03	System Access and Connectivity	13	9		1
SFT04	System Security Administration	8	7		1
SFT05	DAAC Operations and Administration	15	6		2
SFT06	ECS Standard Services	3	1		2

EXHIBIT 3-5: Test Structure and Allocation to ECS Level 3 Requirements

The identified tests address system scenarios involving a variety of functions and capabilities. These tests are designed with the flexibility to be executed, as required, at the various sites. For instance, EXT01 - TRMM Level 0 Data Ingest, will be tested at MSFC with LIS data and at LaRC with CERES data. The site test sequences will be used to correlate test data to a specific test at a site. Exhibit 3-6 presents the initial allocation of tests to the various sites and the level of participation required for these activities using the following convention:

- **Primary Site (P)** - Site is the focal point of the test. These tests either address site specific capabilities or generic capabilities available at each site.

- **Support Site (S)** - Site provides support to another site in the execution of tests. These tests mostly address interaction between sites.

The identified tests are then broken into test cases addressing a specific functionality. Scenarios are then developed for each test case to address both nominal and/or abnormal situations. Section 4 describes the test cases and scenarios for each of the identified tests and are based on reviews of ECS documentation. Additional tests will be identified as follows:

- DAAC Unique Capabilities - These test cases will be developed in cooperation with DAAC personnel to address functionality unique to the site. An example of such is an ECS extension developed at the site. These tests will be categorized as DAAC Specific Tests (DST).

- ECS Contractor Testing - Test reports will be reviewed to identify discrepancies and issues encountered during contractor testing. This data will be used to create test cases to deal with those capabilities that create risk or whose functionality is still in question. If discrepancies are corrected during contractor testing, test cases might address specific testing of such functionality to ensure proper implementation of software changes.

- Test Execution - As a result of testing, the need for additional test cases may become apparent. The Test Conductors (TC) will be responsible for documenting such instances for use in future test activities.

TEST	TITLE	SMC[1]	GSFC	LaRC	MSFC	EDC
Component Functional Thread Tests (CFT)						
CFT01	Science Software Integration and Operations		P	P	P	P
CFT02	Science Product Generation and Availability		P	P	P	P
External Interface Test (EXT)						
EXT01	TRMM Level 0 Data Ingest			P	P	
EXT02	TRMM Data Product Ingest		P	P	P	
EXT03	NOAA and Non-EOS Ancillary Data Ingest		P	P	P	
EXT04	Data Product and Ancillary Data Distribution to TSDIS		P	P	P	
Internal Interface Tests (INT)						
INT01	System Deployment Verification	P	P	P	P	P
INT02	System Test Support Capability	P	P	P	P	P
Stand-Alone Functional Tests (SFT)						
SFT01	Network Operations and Monitoring	P	S	S	S	S
SFT02	System Operations and Administration	P	S	S	S	S
SFT03	System Access and Connectivity	P	P	P	P	P
SFT04	System Security Administration	P	P	P	P	P
SFT05	DAAC Operations and Administration	S	P	P	P	P
SFT06	ECS Standard Services	P	P	P	P	P

(1) Limited SMC functionality will be deployed at the EDF for IR-1.

EXHIBIT 3-6: Test Structure and Allocation to ECS Sites

3.3 Planned Test Sequences

This section provides test sequences, at a test level, for each of the participating sites. The provided sequences do not imply that all test cases and scenarios associated with a particular test will be executed at a site. A detailed test sequence indicating the specific test cases and scenarios to be executed at each of the test sites will be included with the Test Procedures document.

The provided test sequences include the following information:

- **Date** - Planned date for the test.

- **Sequence** - Execution order within planned activities.

- **Test ID** - Test to be executed.

- **Prerequisites** - Indicate tests that need to be completed prior to the execution of the identified test case and/or required test data. This field will indicate test case dependencies and will be used to distinguish multiple executions of a test with different test data.

- **Personnel** - These fields indicate the personnel required to conduct the test. The "Other" column will be used to indicate support from other sites or to mention general remarks.

The priority information contained in Section 3.2 will be used, as required, for rescheduling. The test sequences for each of the sites are presented in the following exhibits:

- Exhibit 3-7: SMC Component Test Sequence

- Exhibit 3-8: GSFC DAAC Component Test Sequence

- Exhibit 3-9: LaRC DAAC Component Test Sequence

- Exhibit 3-10: MSFC DAAC Component Test Sequence

- Exhibit 3-11: EDC DAAC Component Test Sequence.

| DATE | SEQ | TEST ID | PREREQ | PERSONNEL | | |
				IV&V	ECS M&O	OTHER
1/FEB/96	1	INT01		1	1	
	2	SFT01	INT01			1 - GSFC ECS M&O 1 - MSFC ECS M&O 1 - LaRC ECS M&O
2/FEB/96	3	SFT02	SFT01			
	4	SFT03	SFT02			1 - GSFC ECS M&O 1 - MSFC ECS M&O 1 - LaRC ECS M&O
3/FEB/96		Contingency Test Day				
5/FEB/96	5	SFT02	SFT01	1	1	
6/FEB/96	6	SFT04	SFT03			1 - GSFC ECS M&O 1 - MSFC ECS M&O 1 - LaRC ECS M&O
7/FEB/96	7	SFT04	(Cont.)			
8/FEB/96		Reserved for Retesting				
9/FEB/96		Reserved for Retesting				
10/FEB/96		Contingency Test Day				
12/FEB/96		Reserved for Performance Testing				
13/FEB/96		Reserved for Performance Testing				
14/FEB/96	8	INT02	All Tests	1	1	
15/FEB/96	9	INT02	All Tests			
16/FEB/96		SFT01	Support		1	MSFC Testing
17/FEB/96		Contingency Test Day				
19/FEB/96		SFT03	Support		1	MSFC Testing
		SFT05				
20/FEB/96		SFT04				
23/FEB/96		SFT01	Support		1	EDC Testing
24/FEB/96		SFT05				
		SFT03				
25/FEB/96		SFT04				

EXHIBIT 3-7: SMC Component Test Sequence

DATE	SEQ	TEST CASE ID	PREREQ	PERSONNEL		
				IV&V	ECS M&O	OTHER
1/FEB/96	1	INT01		1	1	
		Assist in SMC Testing				
2/FEB/95	2	SFT01	INT01	1	1	
		Assist in SMC Testing				
3/FEB/96		Contingency Test Day				
5/FEB/96	3	SFT05	SFT01	1	1	1 - EDF M&O
	4	SFT03	SFT05			
6/FEB/96	5	SFT04	SFT03			
	6	SFT06				
7/FEB/96	7	EXT02	VIRS	3		
8/FEB/96	8	EXT03	NMC			
9/FEB/96		Reserved for Additional Interface Testing				
10/FEB/96		Contingency Test Day				
12/FEB/96	9	EXT04	EXT02 VIRS	2	1	
13/FEB/96	10	EXT04	EXT03 NMC			
14/FEB/96	11	CFT01	MODIS			
	12	CFT02	MODIS			
15/FEB/96		Reserved for CFT Retesting				
16/FEB/96		Reserved for CFT Retesting				
17/FEB/96		Contingency Test Day				
19/FEB/96		Reserved for DAAC Unique Testing or Performance Testing				
20/FEB/96		Reserved for DAAC Unique Testing or Performance Testing				
21/FEB/96		Reserved for DAAC Unique Testing or Retesting				
22/FEB/96	13	INT02	All Tests	1	1	

EXHIBIT 3-8: GSFC DAAC Component Test Sequence

| DATE | SEQ | TEST CASE ID | PREREQ | PERSONNEL | | |
				IV&V	ECS M&O	OTHER
01/FEB/96	1	INT01		1	1	
		Assist SMC Testing				
02/FEB/96	2	SFT01	INT01	1	1	1 - EDF M&O
		Assist SMC Testing				
03/FEB/96		Contingency Test Day				
05/FEB/96	3	SFT05	SFT01	1	1	1 - EDF M&O
	4	SFT03	SFT05			
	5	SFT06				
06/FEB/96	6	SFT04	SFT03			1 - EDF M&O
	7	EXT01	CERES	3		
07/FEB/96	8	EXT02	SDPF PLTFRM			
	9	EXT03	NESDIS			
	10	EXT04	EXT03 AVHRR			
	11	EXT04	SSM/I			
08/FEB/96	12	CFT01	CERES	2		
	13	CFT01	MOPITT			
	14	CFT01	MISR			
09/FEB/96	15	CFT02	CERES			
10/FEB/96		Reserved for EXT or CFT Retesting				
12/FEB/96		Reserved from DAAC Unique Testing or Retesting				
13/FEB/96		Reserved from DAAC Unique Testing or Retesting				
	16	INT02	All Tests	1	1	
14/FEB/96		Reserved				

EXHIBIT 3-9: LaRC DAAC Component Test Sequence

| DATE | SEQ | TEST CASE ID | PREREQ | PERSONNEL | | |
				IV&V	ECS M&O	OTHER
15/FEB/96	1	INT01		1	1	
16/FEB/96	2	SFT01	INT01			1 - EDF M&O
17/FEB/96		Contingency Test Day				
19/FEB/96	3	SFT03		1	1	1 - EDF M&O
	4	SFT05	SFT03			
	5	SFT06				
20/FEB/96	6	SFT04	SFT03			1 - EDF M&O
	7	EXT01	LIS	3	1	
	8	EXT02	PR			
	9	EXT02	TMI			
21/FEB/96	10	EXT02	TRMM GV			
	11	EXT02	SDPF PLTFRM			
	12	EXT04	TRMM GV			
	13	EXT04	TMI			
	14	EXT04	PR			
	15	EXT04	GPCC			
	16	EXT04	GPCP			
22/FEB/96		Reserved for EXT Retesting or DAAC Unique Testing				
23/FEB/96	17	CFT01	LIS	2	1	
	18	CFT02	LIS			
24/FEB/96		Contingency Test Day				
26/FEB/96	19	CFT02	PR	2	1	
	20	CFT02	TMI			
27/FEB/96		Reserved for DAAC Unique Testing				
28/FEB/96		Reserved for DAAC Unique Testing or Retesting				
29/FEB/96	21	INT02	All Tests	1	1	
		Reserved for DAAC Unique Testing or Retesting				

EXHIBIT 3-10: MSFC DAAC Component Test Sequence

DATE	SEQ	TEST CASE ID	PREREQ	PERSONNEL		
				IV&V	ECS M&O	OTHER
23/FEB/96	1	INT01		1	1	
	2	SFT01	INT01			1 - EDF M&O
24/FEB/96	3	SFT05	SFT01			
	4	SFT03	SFT05			
	5	SFT06				
25/FEB/96	6	SFT04	SFT03			1 - EDF M&O
	7	CFT01	ASTER	2	1	
	8	CFT01	MODIS			
26/FEB/96		Reserved for DAAC Unique Testing or Retesting				
27/FEB/96	9	CFT02	ASTER	2	1	
28/FEB/96	10	INT02	All Tests	1		
		Reserved for DAAC Unique Testing or Retesting				
29/FEB/96		Reserved for DAAC Unique Testing or Retesting				

EXHIBIT 3-11: EDC DAAC Component Test Sequence

3.4 Test Execution and Evaluation

This section discusses test execution information such as: test team composition, daily schedules, test execution, and result evaluation.

3.4.1 Test Personnel

3.4.1.1 Component Acceptance Test Team

Exhibit 3-12 shows the overall structure of the Component Acceptance Test Team. The combined membership of the IV&V Team and DAAC personnel creates an Integrated Product Team (IPT) for the ECS IR-1.
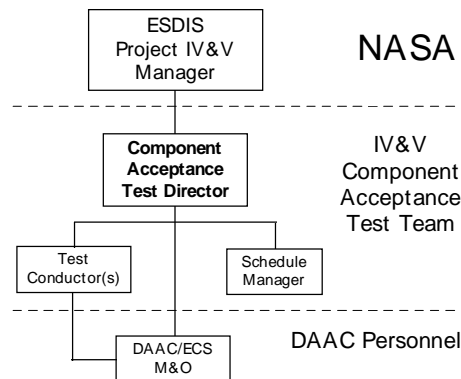
EXHIBIT 3-12: Overall Component Acceptance Test Team

3.4.1.2 Roles and Responsibilities

This section describes the roles and responsibilities for the various members of the Component Acceptance Test Team. Overall responsibilities are provided in the Component Acceptance Master Test Plan.

The Test Director is responsible for the following:

• Submitting all test documentation associated with the specified release, including test plans, procedures, test reports, and schedules.

• Conducting Test Procedure Dry Runs with the test team as required.

• Planning and chairing the Test Readiness Review.

• Coordinating all test personnel and logistics prior and during test execution.

- Reviewing daily status reports and reports on overall test metrics to the IV&V Manager.

- Reviewing unresolved discrepancy reports submitted by test personnel and forwarding unresolved issues to the IV&V Manager.

The Test Conductors are responsible for the following:

- Participating in Test Procedure Dry Runs and Test Readiness Review activities.

- Executing specified tests at assigned test site, as specified in the test plan.

- Generating and/or reviewing discrepancy reports generated at the test site. Coordinating with site personnel as required to resolve discrepancies. Forwarding unresolved issues to the Test Director.

- Submitting daily status reports to the Test Director.

- Generating test reports for assigned test site.

- Conducting daily test briefings at the assigned test site.

The Schedule Manager is responsible for the following:

- Maintaining schedules for all activities, including overall timelines and site specific schedules.

- Reviewing ESDIS provided schedules and informing the Test Director of possible conflicts and resource contentions.

- Generating formal schedules for the test team.

The Test Analysts are responsible for the following:

- Assisting in the execution of test procedures as directed by the Test Conductors.

- Generating discrepancy reports as needed.

DAAC personnel are divided into DAAC M&O and ECS M&O personnel. DAAC M&O participate in testing as follows:

- Reviewing test documentation and identifying issues affecting testing at the DAAC.

- Participating in the Test Readiness Review.

- Scheduling ECS M&O personnel at the site to support tests.

- Identifying DAAC unique scenarios to be tested at the site.

- Reviewing discrepancy reports with the Test Conductors.

- Providing input to test reporting process.

DAAC ECS M&O Personnel participate in testing activities as follows:

- Assisting in the execution of test procedures as indicated by the Test Conductors.

- Assisting in problem resolution at the DAAC, also serving as a point of contact to ECS M&O personnel at the EDF.

- Identifying discrepancy reports as needed.

- Participating in daily test briefings and providing input to daily site status reporting activities.

3.4.1.3 Test Team Assignments

Exhibit 3-13 shows the allocation of test personnel to currently scheduled activities. Allocation also includes roles as follows: TD - Test Director, TC - Test Conductor, TA - Test Analyst.

Team Member	EDF	GSFC	LaRC	MSFC	EDC
IV&V #1	TD (1-29/FEB)				
IV&V#2	TC (1-14/FEB)				
IV&V#3	TA (1-14/FEB)			TC (15-29/FEB)	
IV&V#4		TC (1-22/FEB)			TC (23-29/FEB)
IV&V#5	TA (15-29/FEB)		TC (1-14/FEB)		

EXHIBIT 3-13: IV&V Test Team Assignments during ECS IR-1 Acceptance Testing

3.4.2 Test Execution

The Test Director has the overall responsibility for all test activities. The detailed test sequences, included with the test procedures, will be used for conducting all scheduled tests and are based from the high level ones presented in Section 3.3. The following sections provide guidelines for daily activity scheduling and the format for submitting daily reports.

3.4.2.1 Daily Test Schedule

Exhibit 3-14 provides a test schedule for a nominal day. This schedule will be adjusted as dictated by actual events and constraints and is provided for general guidance.

TIME	ACTIVITY	REMARKS
0730 (LOCAL)	Daily Test Team Briefing	Topics: • Planned tests • Schedule and Test Deviations • Progress Report.
0830	Morning Test Activities	Activities include: • Configuration check • Test Execution and documentation.
1230	Lunch	
1345	Status Check	Review morning activities. Setup for afternoon testing.
1400	Afternoon Test Activities	Activities include: • Configuration check • Test Execution and documentation.
1800	End of Test Activities	Preparation for debriefing starts.
1830	Daily Test Team Debrief	Topics: • Test Results • Issues • Next day activities.
1930	Issue Daily Site Status Report	Addressed to Test Director (TD).
2000 through 2200	Contingency Test Time	As needed: • Repeat incomplete tests. • Perform tests required to support upcoming activities.

EXHIBIT 3-14: Nominal Daily Test Schedule

3.4.2.2 Daily Site Status Report

Exhibit 3-15 provides a sample Daily Status Report to be submitted by the Test Conductor(s) after the test debrief. This message format differs from the one presented in the EITVP to facilitate the reporting of the metrics identified in Section 3.4.5.

```
(DATE)


TO:      (IV&V Test Director)
         Distribution
FROM:  (IV&V Test Conductor)


SUBJECT:  Daily Site Status Report for (SITE/DAAC) Acceptance Testing


The following is a summary of test activities for (DATE).
         1.  Number of Tests Scheduled/Completed:
         2.  Number of Tests Carried Over from Previous Day:
         3.  Summary Results


            TEST CASE ID          TEST RESULT          REMARKS
            XXX.XX                (SAT/UNSAT)          (Retesting, rescheduled, etc.)


4.  Issues/Action Items
```

EXHIBIT 3-15: Daily Site Status Report Format

3.4.2.3 Discrepancy Reporting

Discrepancy reporting will be performed as specified in the Component Acceptance Master Test Plan. Exhibit 3-16 provides an overview of the flow of reports from the various sites. The final disposition of these reports will be tracked by the Component Acceptance Test Team via the Discrepancy Reporting Tool. Testing of software updates, i.e. for emergency change requests, will be performed during planned visits as permitted by schedule constraints, criticality of the request, and if associated CM documentation is provided. If the Component Test Team has left a site, testing of implemented change requests might be coordinated with HAIS and performed at the EDF. Otherwise, implemented change requests are expected to be incorporated within a major ECS release and will be tested during scheduled activities.
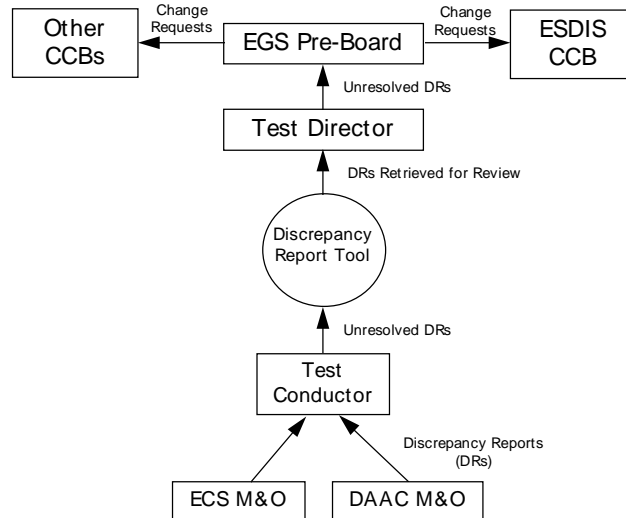
EXHIBIT 3-16: Discrepancy Report Submission Process

3.4.3 Test Evaluation

Test evaluation consist of evaluating the results of acceptance test activities to determine if the delivered system meets requirements. The following sections provide guidelines to help perform an overall evaluation of the test results.

3.4.3.1 Metrics

Metrics will be generated to assess the progress and status of test activities. These metrics will be generated at the sites and forwarded to the Test Director who in turn will generate system wide values. The following metrics will be collected during the testing activities:

- **Number of Completed Test Cases:** This is a progress metric that will be compared against scheduled tests cases. These metrics will be subcategorized by results (satisfactory versus unsatisfactory). Goal is to be within 10% of the planned value.

- **Successful Test Case Index:** This metric will be calculated from the ratio of successful test cases to total tests cases. Favorable indices are those of a value above 0.9.

- **Number of Opened Discrepancy Reports:** This metric will be collected during testing and will be categorized by problem report severity.

- **Retesting Index:** This metric will be calculated from the ratio of retested test cases to total number of test cases. Favorable indices are those below 0.1.

The Daily Site Status Reports, described in Section 3.4.2.2, will be the tool for relaying this information to the Test Director.

3.4.3.2 Site Acceptance Guidelines

The Test Conductors at the test sites will be responsible for evaluating test results and determining the success of acceptance testing activities. The following worksheet, Exhibit 3-17, was developed using some of the metrics described in Section 3.4.3.1 and focusing on the ECS IR-1 objectives. The intent of this worksheet is to provide an overall assessment of test results at a site. As it can be seen, each of the major ECS IR-1 objectives has been given a weight and mapped to specified tests.

Release Objective	Scheduled TC/Scenarios	Number of Successful TC/Scenarios	Successful Test Case Index	Weight	Weighted Successful Test Case Index
Provide Infrastructure (SFT, INT, CFT02 tests)				40%	
Support TRMM Interface Testing (EXT tests)				25%	
Support Science S/W Integration and Test (CFT01 Tests)				25%	
DAAC Unique Scenarios (DST Tests)				10%	
Overall Site Index (Sum of all Weighted Indices)					

EXHIBIT 3-17: Site Test Result Evaluation Worksheet

The Successful Test Case Index is calculated as described in Section 3.4.3.1. The results can vary from 0 to 1, with 1 being a completely successful activity. The Weighted Successful Test Case Index is calculated by multiplying the weight for a particular release objective category by the Successful Test Case Index. The Overall Site Index is the sum of all weighted indices and will range from 0 to 1, again 1 being a completely successful test. The results of this worksheet can be evaluated along with the severity of the discrepancy reports generated at the site to determine whether acceptance test activities have been successful. The weights assigned to the various release objectives can also be adjusted to reflect changing priorities and/or the omission of DAAC unique tests.

3.4.3.3 Overall System Acceptance Guidelines

The Test Director will complete a test result evaluation worksheet similar to the site's, but addressing the entire system. In this case, weights will be provided for each of the sites. For example, testing at GSFC will be more extensive due to the additional allocated time, thus failure of GSFC to complete acceptance test activities will be of greater influence than unsuccessful testing at EDC. In addition, the Test Director must remember that similar capabilities are being

tested at various sites and that a failure at a particular site might be dependent on installation faults rather than the system itself. For instance, if Science Software Integration and Tests succeed at GSFC and MSFC, and fail at EDC, the results should reflect that the overall test for that functionality was successful but that there appeared to be site specific problems at EDC. All these factors must be considered when determining the overall result of acceptance test activities. Exhibit 3-18 provides the overall system evaluation worksheet to be used by the Test Director.

Release Objective	EDF Weighted Index[1] (30%)	GSFC Weighted Index (30%)	LaRC Weighted Index (15%)	MSFC Weighted Index (15%)	EDC Weighted Index (10%)	Acceptance Test Success Index
Provide Infrastructure (SFT, INT, CFT02 tests)						
Support TRMM Interface Testing (EXT tests)						
Support Science S/W Integration and Test (CFT01 Tests)						
DAAC Unique Scenarios (DST Tests)						

(1) Site Weighted Index is calculated by obtaining the Site Weighted Successful Test Case Index for the Release Objective and multiplying it by the Site Weight indicated in the column.

EXHIBIT 3-18: Overall System Test Result Evaluation Worksheet

The Site Weighted Successful Test Case indices are collected from the test sites for each of the release objectives. These indices are then multiplied by the weight for each of the sites resulting in a weighted index for the release capability per site. The Acceptance Test Success Index is then calculated by adding the values for all the sites for each release objective. Again, values range from 0 to 1, with 1 being a completely successful test.

The values provided by both the site and system test result evaluation worksheets are meant to assist the Test Director and the IV&V Manager in determining the final results of acceptance testing activities. In addition to these values, it is important that the following points be considered:

- Importance of the various release objectives to future releases.
- Any site dependent issues affecting test results.
- Unresolved discrepancy reports and their impact.

Once all these factors are considered, a final assessment can be made regarding the success of ECS IR-1 Component Acceptance Testing.

3.5 Ancillary Test Information

This section covers areas such as training, test data, and message formats.

3.5.1 Request for DAAC Support

Support from the DAACs will be requested through the use of a standard message format. This message will be provided as soon as details are known and will be updated if needed. Exhibit 3-19 provides the format for this message to the DAACs.

(DATE)

TO: (DAAC Manager)/(DAAC)

FROM: (Test Director)/IV&V

SUBJECT: Request for M&O Support for ECS IR-1 Acceptance Testing

REF: (Message Reference for Tracking)

This message is to request the following support for the ECS IR-1 Acceptance Test effort to be conducted at your facility. Please refer to the EOSDIS Test Version Component Acceptance Test Plan for ECS IR-1 for additional information about this effort.

1. Test Dates: (Specify Test Period)

2. Requested Resources
  - Personnel: (Provide a summary of required personnel).

  - Equipment: (Provide a summary of any specific requirements).

  - Facilities: (Provide any facilities requests, i.e., desk, conference room, etc.)

3. Test Team Information - This information is provided to facilitate access to the site:

     Test Conductor: (name)/SSN/Nationality
     Test Analyst: (name)/SSN/Nationality (repeat as needed)
     Team Arrival Date: (if available)
     Point of Contact: (Hotel/Telephone number)

4. Other Information - (Include additional information needed by DAAC personnel).

Thanks for your cooperation in this matter.

(Name)
Test Director/IV&V/ECS IR-1 Acceptance Test
Phone:
FAX:

EXHIBIT 3-19: Message Format to DAACs

3.5.2 Training

The following training has been identified for the IV&V Team participating in test activities. This training is required to allow a better understanding of the various products and capabilities being provided in IR-1. System training for DAAC ECS M&O personnel will be provided by HAIS.

- COTS Packages: DCE, HP Open View, LoadRunner, XRunner.
- Custom Software: AITTL interface, Ingest interface.

DAAC M&O personnel will be provided this test plan and associated procedures for familiarization with the AT process. Consideration will be given to include DAAC/ECS M&O during the scheduled test dry runs. Their participation will depend on the state of the procedures, any perceived benefits, and personnel availability.

3.5.3 Test Data

Test data will be required to simulate inputs and outputs to the system. The following is a summary of the test data required for ECS IR-1 AT activities. Detailed test data information is listed for each test in Section 4.0.

Data and Products
- CERES, LIS L0
- TMI (L1A, L1B, L2A, L2B, L3A, L3B, Browse, Metadata)
- PR (L1A, L1B, L1C, L2A, L2B, L3A, L3B, Browse, Metadata)
- VIRS (L1A, L1B, Browse, Metadata)

Science Software (including Test Data and Calibration Coefficients, and updates)
- TRMM: CERES, LIS
- AM-1: ASTER, MOPITT, MODIS, MISR
- SCF Initial Data Product Specifications
- SCF Test Product Reviews

Ancillary Data
- SDPF Predictive and Definitive Orbit Data
- SDPF Science & Ancillary Data
- SSM/I: Snow/Ice Cover
- AVHRR: Aerosol, Vegetation Index
- NOAA: GPCP, GPCC
- NMC: FNL
- TRMM Ground Validation Data (+ assoc. metadata)
- TSDIS Directory and Guide Information

The Component Acceptance Test Team is currently participating in the GSFC Code 170, Mission to Planet Earth, Test Data Set Working Group as a way of coordinate requirements with other test organizations. This working group will be the focal point for test data management activities.

3.5.4 Test Tools

The IV&V Test Team will require the use of test tools in addition to capabilities provided by the system. The following is a preliminary list of tools, some which are still under investigation:

- **Test Management Database (TMDB)** - This tool will be used to manage test information, including test descriptions, allocated requirements, and support information.

- **Test Buddy/Notebook PC** - This platform will be used at each of the DAACs to document test progress and to relay data to the TD. It will also include office automation tools to support testing.

- **Simulators** - Since actual external interfaces are not present during component AT, simulators will be required for TSDIS, NESDIS, NOAA/DAO, SDPF, and SCF. The availability of an EBNET simulator, as well as those used during HAIS SI&T testing, will be researched in order to support external interface testing. How such capability will be provided is still under investigation.

- **LoadRunner/XRunner** - The use of these tools is still under evaluation. LoadRunner would be used to stress the system while XRunner is mainly used to develop and execute test scripts. One identified issue is the availability of these tools at the various sites.

- **Network Analyzers** - These tools will be used to analyze network traffic within the LAN and WAN environments to verify protocols and security. The actual complement of tools is still under consideration.

- **Discrepancy Reporting Tool** - This tool will be used to enter and manage discrepancy reports resulting from testing activities. The selection of an actual tool is still pending at this time.

4.0 TEST DESCRIPTIONS

This section provides test descriptions along with specified test cases.

4.1 Component Functional Thread Tests (CFT)

CFT01 - Science Software Integration and Operations

Test Objectives

This test verifies the capability of ECS at the DAACs to receive, integrate, and execute science software. It also addresses monitoring and configuration management of such software. Specific objectives to be tested are:

- Receipt of algorithm and calibration coefficients from SCF.
- Algorithm validation.
- Algorithm testing, monitoring, and result reporting.
- Algorithm configuration management.
- Algorithm update.

Applicability

This test will be performed at the DAACs for the following algorithms:

- MSFC DAAC - LIS algorithms
- LaRC DAAC - CERES, MOPITT, and MISR algorithms
- GSFC DAAC - MODIS algorithms
- EDC DAAC - ASTER, MODIS algorithms.

This test and associated test cases will be scheduled multiple times at a DAAC for the applicable algorithms. Refer to site test sequences in Section 3.3 for specific scheduling information.

Requirements Verified

The following requirements will be verified upon completion of this test:

REQ ID	Requirement Text	Requirement Criticality
DADS0190	Each DADS shall receive from the SCF, at a minimum, the following: g._Algorithms	Mission Essential
EOSD0500	ECS shall perform the following major functions: d._Communications and Networking e._Data Input f._Data Processing	Mission Essential

REQ ID	Requirement Text	Requirement Criticality
EOSD0730	Each ECS element shall be capable of verifying the fidelity of the ECS element interface to: b._Entities external to ECS at any time during the lifetime of the ECS	Mission Essential
EOSD1703	ECS shall provide maintenance and operations interfaces to the DAACs to support the functions of: b). Science Algorithm Integration	Mission Essential
EOSD1750	ECS elements shall receive data including the following types of supporting information from the ECS science community (TLs, TMs, PIs, and Co-Is): a._Algorithms b._Software fixes d._Integration support requests	Mission Essential
EOSD1760	The ECS elements shall send the following types of data at a minimum to the ECS science community (TLs, TMs, PIs, and Co-Is): a._Software Problem Reports	Mission Fulfillment
EOSD5020	ECS software, hardware, and interfaces shall enable transparent portability across heterogeneous site architectures, i.e. performing the same function at different ECS sites that may have different hardware implementations.	Mission Fulfillment
ESN-0006	ESN shall interface with NSI to reach all external non-ECS network-attached facilities and science users.	Mission Essential
PGS-0270	The PGS shall provide the capability to perform the following functions, at a minimum: b. Suspend execution of tasks c. Resume execution of a suspended task d. Cancel execution of tasks	Mission Essential
PGS-0360	The PGS shall generate a PGS processing log that accounts for all data processing activities.	Mission Essential
PGS-0370	The PGS shall utilize the LSM to generate a PGS resource utilization report.	Mission Essential
PGS-0400	The PGS shall have the capability to monitor the status of all algorithm and calibration coefficient testing and generate algorithm and calibration test reports.	Mission Essential
PGS-0490	The PGS shall have the capability to access and use, for the generation of Standard Products, information such as: a. Digital terrain map databases b. Land/sea databases c. Climatology databases d. Digital political map databases	Mission Essential
PGS-0602	The PGS shall have the capability to accept POSIX-compliant science algorithms and compile algorithm source code written in a standard programming language (e.g., FORTRAN, C, Ada).	Mission Essential
PGS-0610	The PGS shall accept from the SCFs new or modified calibration coefficients to be validated in the test environment. Calibration coefficients shall contain the following information at a minimum: a._Identification of coefficient data set b._Calibration coefficients values c._Author and version number d._Identification of related processing algorithm e._Start and stop date/time of applicability f._Date and time g._SCF identification h._Reasons for update	Mission Essential
PGS-0620	The PGS shall have the capability to validate received calibration coefficients for completeness and correct format.	Mission Essential

REQ ID	Requirement Text	Requirement Criticality
PGS-0640	The PGS shall accept from the SCF new or modified Standard Product algorithms to be tested at the processing facility. This software shall be received into the test environment and shall contain the following information at a minimum : a._Algorithm identification b._Algorithm source code c._List of required inputs d._Processing dependencies e._Test data and procedures f._Algorithm documentation	Mission Essential
PGS-0650	The PGS shall have the capability to validate required operational algorithm characteristics prior to scheduling algorithm test time. These characteristics shall be include at a minimum: a._Language b._Operational impacts (e.g., algorithm software size, required resources) c._Algorithm documentation d._Data handling standards as appropriate e._Units and models used f._Operational compatibility g._Required metadata outputs	Mission Essential
PGS-0860	The PGS shall have the capability to schedule and coordinate algorithm and calibration coefficient test time in the test environment with the appropriate SCF.	Mission Essential
PGS-0900	The PGS shall send test products to the SCF for analysis. These shall contain the results of algorithm testing and shall contain the following information at a minimum: a._Algorithm identification b._Test time(s) c._Processor identification d._Test results	Mission Essential
PGS-0910	The PGS shall have the capability to support analysis of algorithm test results.	Mission Essential
PGS-0920	The PGS shall have the capability to validate, through testing, that SCF processing algorithms will execute properly in the operational environment. Validation shall include final compilation and linkage of the source code and testing to verify proper software execution in the operational environment based on indicated data and test results provided by the SCF and the investigator, but shall not include scientific validation of products.	Mission Essential
PGS-0925	The PGS shall validate algorithms used for conversions, calibrations and transformations of EOS engineering data.	Mission Essential
PGS-0940	The PGS shall provide storage for all candidate algorithms' software executables and calibration coefficients.	Mission Essential
PGS-0950	The PGS shall interface to the SMC to maintain configuration control of all algorithms and calibration coefficients used in operational Standard Product production. Controlled information shall contain at a minimum: a._Source code including version number and author b._Benchmark test procedures, test data, and results c._Date and time of operational installation d._Compiler identification and version e._Final algorithm documentation	Mission Essential
PGS-0970	The PGS shall provide access subroutines that enforce compliance with the adopted standard ECS formats.	Mission Essential
PGS-0980	The PGS shall provide job control routines that provide all required task parameters to the Standard Product software.	Mission Essential
PGS-0990	The PGS shall provide error logging subroutines for use by Standard Product software in notifying the system operators of conditions requiring their attention.	Mission Essential

REQ ID	Requirement Text	Requirement Criticality
PGS-1000	The PGS shall provide error logging subroutines for use by Standard Product software in notifying users of conditions requiring their attention.	Mission Essential
PGS-1010	The PGS shall provide mass storage allocation subroutines that provide algorithms with a means for dynamic allocation of storage for temporary files.	Mission Essential
PGS-1015	The PGS shall provide ancillary data access subroutines that provide Standard Product software access to ephemeris data (e.g., solar, lunar, and satellite ephemeris), Earth rotation data, and time and position measurement data. These subroutines shall perform operations such as: a. Interpolation b. Extrapolation c. Coordinate system conversion	Mission Essential
PGS-1020	The PGS shall provide mathematical libraries including: a. Linear algebra and analysis (e.g., LINPAC, IMSL) b. Statistical calculations (e.g., SAS, SPSS)	Mission Essential
PGS-1025	The PGS shall provide a Science Processing Library containing routines such as: a. Image processing routines b. Data visualization routines c. Graphics routines	Mission Essential
PGS-1030	The PGS shall provide a toolkit to the SCF containing versions of the routines specified in requirements PGS-0970 to PGS-1020.	Mission Essential
PGS-1220	The PGS shall have the capability to receive GFE databases and associated tools, including COTS and public domain databases, and maintain them as required as inputs to product generation: Example databases are: a. Digital terrain map databases b. Land/sea databases c. Climatology databases d. Digital political map databases	Mission Essential
PGS-1315	Each PGS shall have the capacity to support I/O to temporary and intermediate storage or multiple passes over input products as required by individual science algorithms.	Mission Essential
SDPS0090	The SDPS shall interface with the PIs and the other science users to support the development and testing of data product algorithms and QA of produced data products.	Mission Essential

Test Configuration

- Hardware: AI&T Server and Workstation.
- Software: AITTL.
- Test Tools: SCF Simulation.

Support Requirements

a. Personnel

- 1 IV&V at AI&T Workstation.
- 1 ECS M&O at AI&T Workstation.
- 1 IV&V for simulation support.

b. Test Data Descriptions

Test Data
CERES Science S/W Delivery Package
LIS Science S/W Delivery Package
ASTER Science S/W Delivery Package
MOPITT Science S/W Delivery Package
MODIS Science S/W Delivery Package
MISR Science S/W Delivery Package
CERES Calibration Coefficients
LIS Calibration Coefficients
ASTER Calibration Coefficients
MOPITT Calibration Coefficients
MODIS Calibration Coefficients
MISR Calibration Coefficients

<u>Test Cases</u>

CFT01.1: Receipt of Science Software Delivery Package and/or Calibration Coefficients

This test case addresses nominal transmissions of science software delivery packages and/or calibration coefficients from the corresponding SCF. The standard sequence to be executed involves the following steps:

- Coordinate receipt of package and/or coefficients with provider.
- Analysis of Delivery Record File for content.
- Transmission of initial and updates of existing science software delivery packages and/or calibration coefficients.

The following scenarios will be tested as part of this test case:

Scenario	Description	Acceptance Criteria
1	Coordinate w/SCF the receipt of Science Software delivery package	Coordination achieved (phone).
2	Transfer Science Software delivery package from source to host through manual file transfer (ftp).	Files transferred successfully.
3	Coordinate w/SCF the receipt of calibration coefficient package	Coordination achieved (phone).
4	Transfer calibration coefficient package from source to host through manual file transfer (ftp).	Files transferred successfully.
5	Coordinate w/SCF the receipt of	Coordination achieved

	algorithm update package	(phone).
6	Transfer algorithm update package from source to host through manual file transfer (ftp).	Files transferred successfully.
7	Coordinate w/SCF the receipt of calibration coefficient update package	Coordination achieved (phone).
8	Transfer calibration coefficient update package from source to host through manual file transfer (ftp).	Files transferred successfully.

Acceptance Criteria:

- Source files and transferred files will be compared to verify proper transmission.
- Algorithms and calibration coefficients available for validation activities in **TBD** directory.
- Acceptable standard product algorithm files will contain:
      a. Algorithm identification
      b. Algorithm source code
      c. List of required inputs
      d. Processing dependencies
      e. Test data and procedures
      f. Algorithm documentation.
- Acceptable calibration coefficient files will contain:
      a. Identification of coefficient data set
      b. Calibration coefficients values
      c. Author and version number
      d. Identification of related processing algorithm
      e. Start and stop date/time of applicability
      f. Date and time
      g. SCF identification
      h. Reasons for update.

CFT01.2: SCF Algorithm and Calibration Coefficient Validation

This test case addresses the validation of the science software delivery package. This test case involves the validation of received package against ESDIS standards and other pre-defined criteria.

The following scenarios will be tested as part of this test case:

Scenario	Description	Acceptance Criteria
1	Validation of valid Science S/W Delivery Package (new or update).	Successful validation, software ready for CM.

2	Attempt to validate an invalid Science S/W Delivery Package (new or update).	Error detected, events logged, notification provided to originator.
3	Validation of valid Calibration Coefficient Delivery Package (new or update).	Successful validation, software ready for CM.
4	Attempt to validate an invalid Calibration Coefficient Delivery Package (new or update).	Error detected, events logged, notification provided to originator.

Acceptance Criteria:

- Valid data sets are available for incorporation into site CM tool.
- Algorithm characteristics include:
  - a. Language: C, C++, FORTRAN 77, FORTRAN 90, and Ada(at LaRC only)
  - b. Operational impacts (e.g., algorithm software size, required resources)
  - c. Algorithm documentation
  - d. Data handling standards as appropriate
  - e. Units and models used
  - f. Operational compatibility
  - g. Required metadata outputs.
- Calibration coefficients are checked for completeness and correct format.
- Validation check detects and logs errors associated with the algorithms. Provider is notified of condition and events are logged in the system logs.

CFT01.3: Algorithm and Calibration Coefficient Configuration Management

This test case ensures that specified algorithms can be placed into configuration management control at the site. This test case involves the following activities:

- Placing algorithm and related data and information under configuration management control.
- Verifying with configuration management tool the availability of the algorithm to users.

The scenarios to be tested are as follows:

Scenario	Description	Acceptance Criteria
1	Place algorithm under configuration control with general access.	Algorithm placed under control and available to general users.
2	Place algorithm under configuration control with limited access.	Algorithm accessible to selected users.
3	Algorithm retrieval by authorized user.	Algorithm retrieved.

4	Algorithm retrieval by an unauthorized user.	Algorithm unavailable.
5	Algorithm retrieved and updated by an authorized user.	Updated algorithm incorporated into CM.
6	Algorithm retrieved for execution by an authorized user.	Algorithm retrieved.
7	Algorithm retrieved for execution by an unauthorized user.	Algorithm unavailable.
8	Place calibration coefficient under configuration control with general access.	Calibration coefficient placed under control and available to general users.
9	Calibration coefficient retrieval by authorized user.	Calibration coefficient retrieved.

Acceptance Criteria:

- Algorithm and calibration coefficients placed under configuration management control at the site.
- Controlled information shall contain:
    a. Source code including version number and author
    b. Benchmark test procedures, test data, and results
    c. Date and time of operational installation
    d. Compiler identification and version
    e. Final algorithm documentation.
- Algorithm and calibration coefficients are only accessible to designated users.

CFT01.4: Algorithm Execution and Monitoring

This test case addresses the compilation and linking of algorithms followed by execution with either test or other data. Execution and status of these algorithms is monitored to determine and note any problems or issues. Results are generated and reported to the originator. This test case involves the following activities:

- Algorithm identified, compiled, and linked with DAAC version of SDP Toolkit.
- Algorithm is submitted for execution along with test data.
- Algorithm execution is monitored and evaluated.
- Execution results identified and provided to the SCFs.

Provided compilers are: C, C++, FORTRAN 77 and 90, and Ada (LaRC only).

The scenarios to be tested are as follows:

Scenario	Description	Acceptance Criteria
1	Execution of valid Science S/W Delivery Package.	Successful execution, monitoring, and report generation.
2	Attempt to execute algorithm containing embedded errors	Errors detected and reported to originator.
3	Test products sent to TBD SCF for analysis.	Files successfully transferred.
4	Algorithm test results analyzed	Out of threshold differences identified.

Acceptance Criteria:

- Algorithm is successfully compiled and linked.
- Algorithm is executed and monitored.
- Test/Execution report is provided to applicable SCFs.
- Test products sent to applicable SCF for analysis contain:
    a. algorithm identification
    b. test time(s)
    c. processor identification
    d. test results
- Test results analysis detects differences.

CFT02 - Science Product Generation and Distribution

Test Objectives

This test addresses the generation of science products. Aspects of product generation to be tested include the capability to submit, schedule, and manage science product generation jobs. The second part of the test addresses the ability to receive supporting databases. Specific test objectives are:

- Queuing and execution of algorithms.
- Receipt of GFE databases and associated tools.

Applicability

Science product generation will be exercised at all DAACs, except EDC. Tests will be repeated at the sites for the identified test data. Refer to site test sequence in Section 3.3 for additional detail.

Requirements Verified

The following requirements will be verified upon completion of this test:

REQ ID	Requirement Text	Requirement Criticality
EOSD0502	ECS shall provide an integrated set of toolkits consisting of software tools for each ECS element.	Mission Essential
PGS-0270	The PGS shall provide the capability to perform the following functions, at a minimum: b._Suspend execution of tasks c._Resume execution of a suspended task d._Cancel execution of tasks	Mission Essential
PGS-0360	The PGS shall generate a PGS processing log that accounts for all data processing activities.	Mission Essential
PGS-0370	The PGS shall utilize the LSM to generate a PGS resource utilization report.	Mission Essential
PGS-0490	The PGS shall have the capability to access and use, for the generation of Standard Products, information such as: a. Digital terrain map databases b. Land/sea databases c. Climatology databases d. Digital political map databases	Mission Essential
PGS-0980	The PGS shall provide job control routines that provide all required task parameters to the Standard Product software.	Mission Essential
PGS-0990	The PGS shall provide error logging subroutines for use by Standard Product software in notifying the system operators of conditions requiring their attention.	Mission Essential
PGS-1000	The PGS shall provide error logging subroutines for use by Standard Product software in notifying users of conditions requiring their attention.	Mission Essential
PGS-1010	The PGS shall provide mass storage allocation subroutines that provide algorithms with a means for dynamic allocation of storage for temporary files.	Mission Essential

REQ ID	Requirement Text	Requirement Criticality
PGS-1015	The PGS shall provide ancillary data access subroutines that provide Standard Product software access to ephemeris data (e.g., solar, lunar, and satellite ephemeris), Earth rotation data, and time and position measurement data. These subroutines shall perform operations such as: a. Interpolation b. Extrapolation c. Coordinate system conversion	Mission Essential
PGS-1020	The PGS shall provide mathematical libraries including: a. Linear algebra and analysis (e.g., LINPAC, IMSL) b. Statistical calculations (e.g., SAS, SPSS)	Mission Essential
PGS-1025	The PGS shall provide a Science Processing Library containing routines such as: a. Image processing routines b. Data visualization routines c. Graphics routines	Mission Essential
PGS-1220	The PGS shall have the capability to receive GFE databases and associated tools, including COTS and public domain databases, and maintain them as required as inputs to product generation: Example databases are: a. Digital terrain map databases b. Land/sea databases c. Climatology databases d. Digital political map databases	Mission Essential
PGS-1315	Each PGS shall have the capacity to support I/O to temporary and intermediate storage or multiple passes over input products as required by individual science algorithms.	Mission Essential

Test Configuration

- Hardware: Ingest Server, CSS Server.
- Software: PRONG, INGST, DCCI, SDPTK, INCI CSCIs.
- Test Tools: TSDIS Simulation.

Support Requirements

a. Personnel

- 1 IV&V at Ingest Workstation
- 1 ECS M&O at Ingest Workstation
- 1 IV&V for simulation support

b. Test Data Descriptions

Test Data
L1 Data Generation Algorithm
L2 Data Generation Algorithm
L3 Data Generation Algorithm
L4 Data Generation Algorithm
PR Data Products

Test Data
TMI Data Products
VIRS Data Products
NMC Data Products

Test Cases

CFT02.1: Execution of Science Product Generation Algorithms

This test case involves the scheduling and execution of multiple algorithms at a site. It checks the capability to schedule and monitor such tasks. Basic activities related to this test case are:

- Submit and schedule algorithms for execution.
- Monitor execution of algorithms.
- Access databases by algorithm.
- Suspend/resume the execution of algorithms.
- Cancel the execution of algorithms.
- View log.

The conditions to be tested are as follows:

Scenario	Description	Acceptance Criteria
1	Execute algorithm requiring access to a digital terrain map database.	Algorithm utilized proper database. Results, log, and reports available.
2	Execute algorithm requiring access to a land/sea database.	Algorithm utilized proper database. Results, log, and reports available.
3	Execute algorithm requiring access to a climatology database.	Algorithm utilized proper database. Results, log, and reports available.
4	Execute algorithm requiring access to a digital political map database.	Algorithm utilized proper database. Results, log, and reports available.
5	Execute algorithm with embedded errors.	Algorithm errors detected Processing log, and reports available.
6	Execute algorithm requiring access to ephemeris data.	Algorithm utilized proper data. Results, log, and reports available.
7	Execute algorithm requiring access to mathematical libraries.	Algorithm utilized proper libraries. Results, log, and reports available.

Scenario	Description	Acceptance Criteria
8	Execute algorithm requiring access to science processing library routines.	Algorithm utilized proper library routines. Results, log, and reports available.

Acceptance Criteria:

- Algorithms are successfully scheduled and executed within the system.
- View PGS processing log
- View resource utilization report

CFT02.2: Receipt of GFE databases and associated tools

This test case addresses the receipt of GFE databases and associated tools including COTS and public domain databases. The standard sequence will involve the following steps:

- Receipt of GFE databases.
- Storage of databases in location accessible to algorithms

The following scenarios will be tested as part of this test case:

Scenario	Description	Acceptance Criteria
1	Receipt and storage of GFE databases and tools	GFE database received and available
2	Receipt and storage of COTS databases and tools	COTS received and available
3	Receipt and storage of public domain databases and tools	Public domain database received and available

Acceptance Criteria:

- Source files and transferred files will be compared to verify proper transmission, if available.
- Storage location verified as accessible to executing algorithms.

4.2 External Interface Tests (EXT)

EXT01 - TRMM Level 0 Data Ingest

Test Objectives

This test verifies the capability of ECS at the DAACs to receive and ingest TRMM Level 0 data from the CERES and LIS as provided by the SDPF. Specific obejctives to be tested are:

- Scheduling and retrieval of TRMM Level 0 data from the SDPF.
- Ingest of Level 0 data into the ECS data servers.
- Availability of ingested data for algorithms execution and other uses.

Applicability

This test will be performed at the MSFC DAAC for LIS Level 0 data and at the LaRC DAAC for CERES Level 0 data. This test and associated test cases will be scheduled multiple times at a DAAC for the various data files. Refer to site sequence for specific scheduling information.

Requirements Verified

The following requirements will be verified upon completion of this test:

REQ ID	Requirement Text	Requirement Criticality
DADS0130	Each DADS shall receive from the SDPF, at a minimum, the following: a._Production data (L0)	Mission Essential
DADS0250	Each DADS shall receive, at a minimum, data in the following forms: b._Electronic communications network	Mission Essential
DADS1070	The DADS shall send data check and storage status to the provider of ingest data.	Mission Essential
DADS1380	Each DADS shall monitor data transfer between external (non-ECS) elements and the DADS.	Mission Essential
DADS1400	Each DADS shall notify the originating source of the need to retransmit data in the event of transmission difficulties.	Mission Essential
EOSD0500	ECS shall perform the following major functions: d._Communications and Networking e._Data Input f._Data Processing	Mission Essential
EOSD0730	Each ECS element shall be capable of verifying the fidelity of the ECS element interface to: b._Entities external to ECS at any time during the lifetime of the ECS	Mission Essential
EOSD1607	ECS shall receive data from near term Earth Probe missions to include the following as a minimum: a). TRMM data for temporary storage for testing purposes only.	Mission Essential
EOSD1608	ECS elements shall receive from EPDSs the following at a minimum: a._Data products e._Metadata	Mission Essential

REQ ID	Requirement Text	Requirement Criticality
EOSD5020	ECS software, hardware, and interfaces shall enable transparent portability across heterogeneous site architectures, i.e. performing the same function at different ECS sites that may have different hardware implementations.	Mission Fulfillment
ESN-0070	The ESN shall support the elements data flow requirements identified in this specification.	Mission Critical
SDPS0020	The SDPS shall receive EOS science, and engineering data from the SDPF, and non-EOS ancillary data (as listed in Appendix C) from ADCs.	Mission Essential
SDPS0110	The SDPS shall be responsible for coordination of the transfer of production and quick-look science and engineering data from SDPF.	Mission Essential

Test Configuration

- Hardware: Ingest Server.
- Software: INGST, DCCI, INCI CSCIs.
- Test Tools: SDPF Simulation.

Support Requirements

a. Personnel

- 1 IV&V at Ingest Server.
- 1 ECS M&O at Ingest Server.
- 1 IV&V for simulation support.
- 1 IV&V at separate DAAC (Test Case EXT01.3 only).

b. Test Data Descriptions

Test Data
CERES Level 0 Data (for LaRC)
LIS Level 0 Data (for MSFC)
CERES Algorithm utilizing L0 Data
LIS Algorithm utilizing L0 Data

Test Cases

EXT01.1: Transfer of TRMM L0 Data from GSFC SDPF

This test case addresses nominal and faulty transmissions of TRMM Level 0 data to ECS. The standard sequence to be executed involves the following steps:

- Receipt of Authentication Request from SDPF and corresponding Authentication Response from ECS.
- Receipt of a Data Availability Notice (DAN) and corresponding Data Availability Acknowledgement from ECS.
- Execution of file transfer routine.

The following scenarios will be tested as part of this test case:

Scenario	Description	Acceptance Criteria
1	Valid Authentication Request and DAN from SDPF.	Successful transfer of L0 data from SDPF simulation.
2	Invalid Authentication Request from SDPF.	No connection made.
3	Valid Authentication Request and Invalid DAN from SDPF.	Request for corrected DAN. Successful transfer after corrected DAN is retransmitted.
4	Valid Authentication Request and DAN from SDPF.	Successful transfer of L0 data from SDPF simulation.
5	Three valid Authentications Requests and DANS (parallel).	Successful transfer of all three L0 data files.
6	Interrupted File Transfer after valid authentication and DAN.	Error logged, message sent to SDPF.

Acceptance Criteria:

- Source files and transferred files will be compared to verify proper transmission.
- System shall detect error conditions and will appropriately respond by notifying provider and logging events in the system log.

EXT01.2: Ingest and Validation of Received TRMM Level 0 Data

This test case addresses the validation of received data and the process by which afterwards the data is then ingested and transferred to the local ECS server. This test case involves the following:

- Validation of received data against standards and pre-defined criteria.
- Preparation of data for storage within ECS.
- Transfer of data to ECS server.

The following scenarios will be tested as part of this test case:

Scenario	Description	Acceptance Criteria
1	L0 data set with valid specifications.	Successful ingest and transfer to server.
2	L0 data sets with invalid specifications.	Discrepancy identified, events logged, notification provided to originator.

Acceptance Criteria:

- Ingest validation check should detect and log errors associated with the data set. Provider is notified of condition and events are logged in the system logs. The data set should conform with the following specifications:

    a. Valid data type
    b. Includes required metadata
    c. No metadata parameters out of range
    d. No required information missing.

- Nominal data sets are ingested into the ECS for use during algorithm execution and for retrieval by other hosts.

EXT01.3: Level 0 Data Availability for ECS Operations

This test case determines if the ingested data is readily available to support algorithm execution or if it can be retrieved from other DAACs. For IR-1 testing, the data products will be available in temporary storage. The test involves the following activities:

- Searching and locating ingested data.
- Executing an algorithm requiring ingested data.
- Retrieving ingested data from another DAAC.

The scenarios to be tested are as follows:

Scenario	Description	Acceptance Criteria
1	Locate an available L0 data sets	Data set located.
2	Execute Algorithm w/selected L0 data set	Data set retrieved and provided to executing algorithm.
3	Locate and retrieve an available L0 data set from external DAAC	Data located and transferred to DAAC.

Acceptance Criteria:

- Data set located and used by algorithm.
- Data set located and transferred to other site.

EXT02 - TRMM Data Product Ingest

Test Objectives

This test verifies the capability of ECS at the DAACs to receive and ingest TRMM data sets from the TSDIS and ancillary data from SDPF. Specific objectives to be tested are:

- Scheduling and retrieval of TRMM data for TMI and PR at ECS/MSFC.
- Scheduling and retrieval of TRMM data for VIRS at ECS/GSFC.
- Scheduling and retrieval of TRMM GV and TSDIS Directory and Guide Information at ECS/MSFC.
- Scheduling and retrieval of TRMM Platform Orbit and Attitude Data from GSFC SDPF.
- Validation and ingest of TRMM data products into the ECS data servers.
- Availability of ingested data for algorithms execution and other uses.

Applicability

This test will be performed at the MSFC DAAC for PR, TMI, GV data products, and TSDIS Directory and Guide information. Receipt of Platform Attitude and Orbit data will be performed at both MSFC and LaRC. This test and associated test cases will be scheduled multiple times at a DAAC for the identified test data. Refer to site test sequences in Section 3.3 for specific scheduling information.

Requirements Verified

The following requirements will be verified upon completion of this test:

REQ ID	Requirement Text	Requirement Criticality
DADS0170	Each DADS shall be capable of receiving from designated EPDSs and ODCs, at a minimum, the following: a._L0-L4 data sets b._Metadata	Mission Essential
DADS0250	Each DADS shall receive, at a minimum, data in the following forms: b._Electronic communications network	Mission Essential
DADS1070	The DADS shall send data check and storage status to the provider of ingest data.	Mission Essential
DADS1380	Each DADS shall monitor data transfer between external (non-ECS) elements and the DADS.	Mission Essential
DADS1400	Each DADS shall notify the originating source of the need to retransmit data in the event of transmission difficulties.	Mission Essential
EOSD0500	ECS shall perform the following major functions: d._Communications and Networking e._Data Input f._Data Processing	Mission Essential
EOSD0730	Each ECS element shall be capable of verifying the fidelity of the ECS element interface to: b._Entities external to ECS at any time during the lifetime of the ECS	Mission Essential

REQ ID	Requirement Text	Requirement Criticality
EOSD1607	ECS shall receive data from near term Earth Probe missions to include the following as a minimum: a). TRMM data for temporary storage for testing purposes only.	Mission Essential
EOSD1608	ECS elements shall receive from EPDSs the following at a minimum: a._Data products e._Metadata	Mission Essential
EOSD5020	ECS software, hardware, and interfaces shall enable transparent portability across heterogeneous site architectures, i.e. performing the same function at different ECS sites that may have different hardware implementations.	Mission Fulfillment
SDPS0020	The SDPS shall receive EOS science, and engineering data from the SDPF, and non-EOS ancillary data (as listed in Appendix C) from ADCs.	Mission Essential

Test Configuration

- Hardware: Ingest Server.
- Software: INGST, DCCI, INCI CSCIs.
- Test Tools: SDPF and TSDIS simulatiors.

Support Requirements

a. Personnel

- 1 IV&V at Ingest Workstation
- 1 ECS M&O at Ingest Workstation
- 1 IV&V for simulation support
- 1 IV&V at separate DAAC (Test Case EXT03.4 only).

b. Test Data Descriptions

Test Data
TRMM PR L1A and Metadata
TRMM PR L2 and Metadata
TRMM PR L3 and Metadata
TRMM PR L4 and Metadata
TRMM PR Browse
TRMM TMI L1A and Metadata
TRMM TMI L2 and Metadata
TRMM TMI L3 and Metadata
TRMM TMI L4 and Metadata
TRMM TMI Browse
TRMM VIRS L1A and Metadata

Test Data
TRMM VIRS L2 and Metadata
TRMM VIRS L3 and Metadata
TRMM VIRS L4 and Metadata
TRMM VIRS Browse
TRMM GV data
TRMM Platform Orbit and Attitude Data
TSDIS Directory and Guide Information

Test Cases

EXT02.1: Transfer of TRMM Data Products from TSDIS

This test case addresses nominal and faulty transmissions of TSDIS products to ECS. Specifically, delivery of PR and TMI data products, and TSDIS Directory and Guide Information to ECS/MSFC and delivery of VIRS data products to ECS/GSFC. The standard sequence to be executed involves the following steps:

- Receipt of Authentication Request from TSDIS and corresponding Authentication Response from ECS.
- Receipt of a Data Availability Notice (DAN) and corresponding Data Availability Acknowledgement from ECS.
- Execution of file transfer routine.

The following conditions will be tested as part of this test case:

Scenario	Description	Acceptance Criteria
1	Valid Authentication Request and DAN from TSDIS.	Successful transfer of data products.
2	Invalid Authentication Request from TSDIS.	No connection made.
3	Valid Authentication Request and Invalid DAN from TSDIS.	Request for corrected DAN. Successful transfer after corrected DAN is retransmitted.
4	Valid Authentication Request and DAN from TSDIS.	Successful transfer of available data products.
5	Three valid Authentications Requests and DANS (parallel).	Successful transfer of all three files.
6	Interrupted Authentication Request Transmission.	Error logged, message sent to TSDIS.

Scenario	Description	Acceptance Criteria
7	Interrupted Authentication Response Transmission.	Error logged.
8	Interrupted DAN Transmission after valid authentication.	Error logged. message sent to TSDIS.
9	Interrupted DAA Transmission after valid authentication and DAN.	Error logged.
10	Interrupted File Transfer after valid authentication and DAN.	Error logged, message sent to TSDIS.

Acceptance Criteria:

- Source files and transferred files will be compared to verify proper transmission.
- System shall detect error conditions and will appropriately respond.

EXT02.2: Transfer of TRMM Platform Orbit/Attitude Data from GSFC SDPF

This test case addresses nominal and faulty transmissions of TRMM Platform orbit and attitude data from GSFC SDPF to ECS at both the MSFC and LaRC DAACs. The standard sequence to be executed involves the following steps:

- Receipt of Authentication Request from SDPF and corresponding Authentication Response from ECS.
- Receipt of a Data Availability Notice (DAN) and corresponding Data Availability Acknowledgement from ECS.
- Execution of file transfer routine.

The following conditions will be tested as part of this test case:

Scenario	Description	Acceptance Criteria
1	Valid Authentication Request and DAN from SDPF.	Successful transfer. Event logged, notification sent to SDPF.
2	Interrupted File Transfer after valid authentication and DAN.	Error logged, message sent to SDPF.

Acceptance Criteria:

- Source files and transferred files will be compared to verify proper transmission.
- System shall detect error conditions and will appropriately respond.

EXT02.3: Ingest and Validation of Received TRMM Data Products

This test case addresses the validation of received data and the process by which afterwards the data is then ingested and transferred to the local ECS server. This test case involves the following:

- Validation of received data against standards and pre-defined criteria.
- Preparation of data for storage within ECS.
- Transfer of data to ECS server.

The following conditions will be tested as part of this test case:

Scenario	Description	Acceptance Criteria
1	Valid TRMM data sets from TSDIS.	Successful ingest and storage.
2	Invalid TRMM data sets from TSDIS.	Error detected, events logged, notification provided to originator.

Acceptance Criteria:

- Validation check detects and logs errors associated with the data set. Provider is notified of condition. The data set should conform with the following specifications:

    a. Valid data type
    b. Includes required metadata
    c. No metadata parameters out of range
    d. No required information missing.

- Valid data sets are incorporated into the ECS for use during algorithm execution and for retrieval by other hosts and/or users.

EXT02.4: TRMM Data Availability for ECS Operations

This test case determines if the ingested data is readily available to support algorithm execution or if it can be retrieved from other DAACs. The test involves the following activities:

- Searching and locating ingested data.
- Executing an algorithm requiring ingested data.
- Retrieving ingested data from another DAAC.

The conditions to be tested are as follows:

Scenario	Description	Acceptance Criteria
1	Locate valid TRMM data sets	Data set located.
2	Execute Algorithm w/selected data set	Data set retrieved and provided to executing algorithm.
3	Locate and retrieve valid TRMM data set from external DAAC	Data set located and transferred to DAAC.

Acceptance Criteria:

- Data set located and used by algorithm.
- Data set located and transferred to other site.

EXT03 - NOAA and Non-EOS Ancillary Data Ingest

Test Objectives

This test verifies the capability of ECS at the DAACs to receive and ingest Non-EOS and NOAA ancillary data sets from both NESDIS and DAO. Specific objectives to be tested are:

- Polling and retrieval of ancillary data.
- Validation and ingest of ancillary data products into the ECS data servers.
- Availability of ingested ancillary data for algorithms execution and other uses.

Applicability

This test will be performed at the GSFC DAAC for NMC ancillary data products from NOAA/DAO, and at LaRC and MSFC DAACs for NESDIS ancillary data. This test and associated test cases will be scheduled multiple times at a DAAC for the identified test data. Refer to site test sequences in Section 3.3 for specific scheduling information.

Requirements Verified

The following requirements will be verified upon completion of this test:

REQ ID	Requirement Text	Requirement Criticality
DADS0250	Each DADS shall receive, at a minimum, data in the following forms: b._Electronic communications network	Mission Essential
DADS0260	Each DADS shall receive non-EOS correlative and ancillary digital data.	Mission Essential
EOSD0500	ECS shall perform the following major functions: d._Communications and Networking e._Data Input f._Data Processing	Mission Essential
EOSD1710	ECS elements shall exchange with ADCs/ODCs, such as NOAA and other data processing and archiving facilities, information including the following: d._Science Data	Mission Fulfillment
SDPS0020	The SDPS shall receive EOS science, and engineering data from the SDPF, and non-EOS ancillary data (as listed in Appendix C) from ADCs.	Mission Essential

Test Configuration

- Hardware: Ingest Server.
- Software: INGST, DCCI, INCI CSCIs.
- Test Tools: DAO and NESDIS simulation.

Support Requirements

a. Personnel

- 1 IV&V at Ingest Server.
- 1 ECS M&O at Ingest Server.
- 1 IV&V for simulation support
- 1 IV&V at separate DAAC (Test Case EXT03.3 only).

b. Test Data Descriptions

Test Data
NMC Ancillary Data 1. FNL
NESDIS Ancillary Data 1. GPCP 2. GPCC 3. AVHRR-Aerosol 4. AVHRR-Vegetation Index 5. SSM/I-Snow/Ice Cover

Test Cases

EXT03.1: Polling and Transfer of NOAA and Non-EOS Ancillary Data

This test case addresses nominal and faulty transmissions of NOAA/Non-EOS ancillary data to ECS. The standard sequence to be executed involves the following steps:

- Polling source system for availability of ancillary data.
- Generation of a Polling Request upon detection of required data.
- Execution of file transfer routine.

The following scenarios will be tested as part of this test case:

Scenario	Description	Acceptance Criteria
1	Detect data and generate Polling Request for ancillary data file.	Detection and transfer of ancillary data.
2	Detect data and generate Polling Request but file unavailable for transfer.	Detection and generation of Polling Request but failed file transfer. Errors logged.

Scenario	Description	Acceptance Criteria
3	Detect and generate Polling Request but file transfer fails while in progress.	File transfer initiated but errors generated once it is interrupted. (Rescheduled? Manual versus automated?)
4	Detect data and generate Polling Request for three (3) ancillary data files (simultaneously).	All three files transferred to the system.

Acceptance Criteria:

- Source files and transferred files will be compared to verify proper transmission.
- System shall detect error conditions and will appropriately respond.

EXT03.2: Ingest and Validation of Received NOAA/Non-EOS Ancillary Data

This test case addresses the validation of the received data and the subsequent incorporation into ECS storage. This test case involves the following:

- Validation of received data against standards and pre-defined criteria.
- Preparation of data for storage within ECS.
- Transfer of data to ECS server.

The following scenarios will be tested as part of this test case:

Scenario	Description	Acceptance Criteria
1	Complete NOAA ancillary data sets from NESDIS.	Successful ingest and transfer to server.
2	Incomplete NOAA ancillary data sets from NESDIS.	Error detected, events logged, notification provided to originator.
3	Complete NMC ancillary data sets from DAO.	Successful ingest and transfer to server.
4	Incomplete NMC ancillary data sets from DAO	Error detected, events logged, notification provided to originator.

Acceptance Criteria:

- Validation check should detect and log errors associated with the data set. Provider is notified of condition and events are logged in the system logs. The data set should conform with the following specifications:

    a. Valid data type
    b. Includes required metadata
    c. No metadata parameters out of range
    d. No required information missing.

- Valid data sets are incorporated into the ECS for use during algorithm execution and for retrieval by other hosts.

EXT03.3: NOAA Ancillary Data Availability for ECS Operations

This test case demonstrates the availability of the ingested NOAA ancillary data to ECS users. During IR-1 testing, data sets will reside in temporary storage. The test involves the following:

- Searching and locating ingested data.
- Executing an algorithm requiring ingested data.
- Retrieving ingested data from another DAAC.

The scenarios to be tested are as follows:

Scenario	Description	Acceptance Criteria
1	Locate available NOAA ancillary data sets.	Data set located.
2	Execute Algorithm w/selected data set.	Data set retrieved and provided to executing algorithm.
3	Locate and retrieve available NOAA ancillary data set from external DAAC.	Data set located and transferred to external site.

Acceptance Criteria:

- Data set located and used by algorithm.
- Data set located and transferred to other site.

EXT04 - Data Product and Ancillary Data Distribution to TSDIS

Test Objectives

This test addresses the transmission of TRMM data products (VIRS, TMI, PR) and ancillary data (NOAA, NMC) from ECS to TSDIS. It is not clear yet what the trigger for such activity will be (standing order, ad hoc request) and additional detail will be incorporated in later versions of this document. The standard sequence will involve the following steps:

- Process request for data (Ad Hoc or scheduled delivery).
- Authentication Request from ECS to TSDIS.
- File transfer process.
- Data Delivery Notice from ECS, Data Delivery Acknowledgement from TSDIS.

Applicability

This test will be performed at the GSFC, LaRC, and MSFC DAACs for TRMM data products and ancillary data. This test and associated test cases will be scheduled multiple times at a DAAC for the identified test data. Refer to site test sequences in Section 3.3 for specific scheduling information.

Requirements Verified

The following requirements will be verified upon completion of this test:

REQ ID	Requirement Text	Requirement Criticality
	NOTE: Currently there are no L3 requirements allocated to this test. Review of HAIS documentation shows that a similar test has been allocated to L4 requirements but did not have any L3 requirements associated with it. This discrepancy is under review, but it has been decided to maintain this test since it is a major functionality included in IR-1.	

Test Configuration

- Hardware: Data Server.
- Software: DSS, DCCI, INCI CSCIs.
- Test Tools: TSDIS Simulation.

Support Requirements

a. Personnel

- 1 IV&V at Data Server.

- 1 ECS M&O at Data Server.
- 1 IV&V for simulation support
- 1 IV&V at separate DAAC (Test Case EXT03.3 only).

b. Test Data Descriptions

Test Data
TRMM Data Products 1. VIRS L1-L4 2. PR L1-L4 3. TMI L1-L4 4. GV
NMC Ancillary Data 1. FNL
NESDIS Ancillary Data 1. GPCP 2. GPCC 3. AVHRR-Aerosol 4. AVHRR-Vegetation Index 5. SSM/I-Snow/Ice Cover

Test Cases

EXT04.1: TRMM Data Product Transfer to TSDIS

The following conditions will be tested as part of this test case:

Scenario	Description	Acceptance Criteria
1	Valid Authentication Request from TSDIS.	Successful transfer to TSDIS.
2	Invalid Authentication Request from TSDIS.	No connection made.
3	Data Delivery without receipt acknowledgement from TSDIS.	Error condition logged, (file transmission repeated - TBD times).
4	Perform a nominal Ad Hoc request for data.	Successful transfer to TSDIS.
5	Perform a nominal pre-scheduled data transfer.	Successful transfer to TSDIS.
6	Perform an interrupted pre-scheduled data transfer.	Check for number of retries.

Acceptance Criteria:

- Source files and transferred files will be compared to verify proper transmission.
- System shall detect error conditions and will appropriately respond.

EXT04.2: Ancillary Data Transfer to TSDIS

The following scenarios will be tested as part of this test case:

Scenario	Description	Acceptance Criteria
1	Valid Authentication Request from TSDIS.	Successful transfer to TSDIS.
2	Invalid Authentication Request from TSDIS.	No connection made.
3	Data Delivery without receipt acknowledgement from TSDIS.	Error condition logged, (file transmission repeated - TBD times).
4	Perform a nominal Ad Hoc request for data.	Successful transfer to TSDIS.
5	Perform a nominal pre-scheduled data transfer.	Successful transfer to TSDIS.
6	Perform an interrupted pre-scheduled data transfer.	Check for number of retries.

Acceptance Criteria:

- Source files and transferred files will be compared to verify proper transmission.
- System shall detect error conditions and will appropriately respond.

4.3 Internal Interface Tests (INT)

INT01 - System Deployment Verification

Test Objectives

This test verifies that ECS has been properly deployed at the site per Release plan specification and Version Description Document. Specific test objectives are:

- Verifying system software under local configuration management control and correspond to IR-1 Release specifications for the site.
- Verifying hardware configuration at the site corresponds to release specifications.

Applicability

This test will be performed at the SMC and all DAACs.

Requirements Verified

The following requirements will be verified upon completion of this test:

REQ ID	Requirement Text	Requirement Criticality
SMC-2505	The LSM shall update the system-wide inventory data base consisting of all hardware, system software, and scientific software contained within its element.	Mission Essential
SMC-2510	The SMC shall provide at a minimum system-wide configuration management for the operational hardware, scientific and system software, and the SMC toolkit contained within ECS.	Mission Essential
SMC-2515	The LSM shall provide configuration management for at least the operational hardware, system software, and scientific software within its element and for the migration of enhancements into the operational system.	Mission Essential

Test Configuration

- Hardware: Site configuration.
- Software: Configuration Management Tool.
- Test Tools: None.

Support Requirements

a. Personnel

- 1 IV&V.
- 1 ECS M&O.

b. Test Data Descriptions

None.

Test Cases

INT01.1: Site Hardware Configuration Verification

This test case involves performing an inventory of system hardware at the site and verifying it against release specifications

Acceptance Criteria: System hardware configuration corresponds to release specifications.

INT01.2: Site Software Configuration Verification

This test case addresses the verification of system software installed at the site. The configuration management tool is used to verify that the software is under control and corresponds to the release specification and/or version description document.

Acceptance Criteria:

- System software under configuration management control.
- System software corresponds to release specifications.

INT02 - System Test Support Verification

Test Objectives

This test verifies that ECS can support test activities. Specific test objectives are:

- Assessing the ability to view and monitor hardware and software operations through system displays and interfaces.
- Verifying the availability of supporting documentation, including logs and system reports.
- Verifying the capability of the system to support the use of simulation tools.

Applicability

This test will be performed at the EDF and all DAACs.

Requirements Verified

The following requirements will be verified upon completion of this test:

REQ ID	Requirement Text	Requirement Criticality
EOSD0510	ECS shall be capable of being tested during all phases of its development .	Mission Essential
EOSD0780	Each ECS element shall be capable of being monitored during testing.	Mission Fulfillment

Test Configuration

- Hardware: Site configuration.
- Software: Site configuration.
- Test Tools: None.

Support Requirements

a. Personnel

- 1 IV&V.
- 1 ECS M&O.

b. Test Data Descriptions

    None.

<u>Test Cases</u>

INT02.1: System Monitoring Support

This test case involves assessing the system capability to be monitored through displays an user interfaces. These interfaces will be evaluated for accessibility and functionality. Some of these capabilities will be tested throughout the execution of system administration and network monitoring tests.

Acceptance Criteria: Interfaces will be available to monitor system status and performance.

INT02.2: Report and Log Availability

This test case addresses the availability reports and system logs for reviewing system activities and performance during testing activities. Outputs will be generated throughout testing to support this test case.

Acceptance Criteria: Reports and logs are available to review system performance.

4.4 Stand-Alone Functional Tests (SFT)

SFT01 - Network Operations and Monitoring

Test Objective

This test addresses the network operations and administration at the SMC. Specific objectives of this test are:

- Access interfaces to display network configuration and status both locally and at the DAACs, through V0 WAN connectivity.
- Monitor and manage network performance through the use of thresholds and statistics.
- Evaluate network fault isolation and response mechanisms.

Applicability

This test will be performed at the EDF.

Requirements Verified

The following requirements will be verified upon completion of this test:

REQ ID	Requirement Text	Requirement Criticality
ESN-0010	ESN shall provide the following standard services: a._Data Transfer and Management Services b._Electronic Messaging Service c._Remote Terminal Service d._Process to Process Communication Service e._Directory and User Access Control Service f._Network Management Service g._Network Security and Access Control Service h._Internetwork Interface Services	Mission Essential
ESN-0070	The ESN shall support the elements data flow requirements identified in this specification.	Mission Essential
ESN-0210	The ESN management function shall have a capability to obtain status on specific data flows to assure the successful operation of ESN.	Mission Essential
ESN-0620	The ESN shall include a network management function to monitor and control the ESN.	Mission Essential
ESN-0640	The ESN shall include management functions at each ECS element, equipment or gateway within the ESN.	Mission Essential
ESN-0650	The ESN shall perform the following network management functions for each protocol stack implemented in any ECS element, and each communications facility: a._Network Configuration Management b._Network Fault Management c._Network Performance Management d._Network Security Management	Mission Essential
ESN-0740	The ESN network management service shall retrieve performance/fault data about ESN protocol stacks and equipment.	Mission Essential
ESN-0760	The ESN report generation function shall provide, on an interactive and scheduled basis, network configuration, fault and performance management information.	Mission Essential

REQ ID	Requirement Text	Requirement Criticality
ESN-0775	The ESN management service shall have the capability to redirect its reports to different devices such as console, disk or printer.	Mission Essential
ESN-0790	The ESN shall include the following configuration management functions at a minimum: a._collect information describing the state of the network subsystem and its communications resources, b._exercise control over the configuration, parameters, and resources of the subsystem, and over the information collected, c._store the configuration information collected, and d._display the configuration information.	Mission Essential
ESN-0800	The ESN shall be capable of displaying the local network configuration status related to each system locally, and for all systems at the ESN network management facility.	Mission Essential
ESN-0830	The ESN shall have the capability to detect and report communications related errors and events both locally and at the ESN network management facility.	Mission Essential
ESN-0840	The ESN shall have error reporting and event logging.	Mission Essential
ESN-0900	Errors and events to be detected shall include at least: b._communications hardware errors c._protocol errors d._performance degradation conditions e._telecommunications errors and failures	Mission Essential
ESN-1060	The ESN performance management function shall provide the capability to evaluate the performance of ESN resources and interconnection activities.	Mission Essential
ESN-1070	The ESN shall provide the capability to perform the following functions, at a minimum: a._generate/collect network statistics b._control collection/generation of network statistics c._store system statistics and statistical histories d._display the system statistics	Mission Essential
PGS-0430	The PGS shall utilize the LSM to monitor and account for data and information transfer between it and other EOSDIS elements.	Mission Essential

Test Configuration

- Hardware: MSS Server, V0 LAN at each site, V0 WAN.
- Software: MCI, INCI CSCIs.
- Test Tools: **TBD**.

Support Requirements

a. Personnel

- 1 IV&V.
- 1 ECS M&O at EDF.

b. Test Data Descriptions

    None

<u>Test Cases</u>

SFT01.1: Network Configuration and Status Monitoring

This test case addresses the capability to view the network configuration and to assess the status of each of the components. Scenarios to be tested as part of this test case are:

Scenario	Description	Acceptance Criteria
1	Monitor status of network routers.	Status displayed.
2	Monitor the status of network links.	Status displayed.
3	Monitor the status of network bridges.	Status displayed.
4	Monitor the status of network gateways.	Status displayed.
5	View stored information/statistics and generate report summarizing status of network devices and present configuration.	Report generated.

Acceptance Criteria:

- Network configuration display is available for monitoring by system operators.
- Status of the various network components is provided by the system.
- Reports are provided detailing status of network components.

SFT01.2: Network Performance Monitoring

This test addresses the monitoring of system performance through the use of system thresholds. Scenarios to be tested are:

Scenario	Description	Acceptance Criteria
1	Display of currently available network thresholds and resources.	Thresholds displayed.
2	Update of an existing system threshold to a value that would trigger an event.	Treshold updated, threshold violation detected.
3	Update threshold value to nominal level.	Threshold updated, violation corrected.
4	Generate a report for network thresholds to evaluate performance.	Report generated.
5	Generate a resource utilization report.	Report generated.

Acceptance Criteria:

- Network thresholds/resorce utilization can be viewed and updated as required.
- Network enforces thresholds set by the operators.
- Network provides reports to evaluate system performance.

SFT01.3: Network Fault Isolation and Recovery

This test case demonstrates the capability to detect faults within the network. It also determines if the correct responses are generated. Scenarios to be tested are:

Scenario	Description	Acceptance Criteria
1	Simulate a threshold out of limit condition.	Event detected and logged, alarm generated.
2	Simulate a router device unavailability.	Event detected and logged, alarm generated.
3	Simulate an unavailable bridge.	Event detected and logged, alarm generated.
4	Simulate an unavailable gateway.	Event detected and logged, alarm generated.
5	Simulate a DAAC unavailability.	Event detected and logged, alarm generated.
6	Simulate a protocol error.	Event detected and logged, alarm generated.
7	Generate a report of faults within the network.	Report generated.

Acceptance Criteria:

- System will detect abnormal conditions and will trigger appropriate responses.
- System logs will be accessed to evaluate the events and the system responses.

SFT02 - System Operations and Administration

Test Objective

This test addresses the operation and administration of site hardware and software, including performance monitoring. Specific objectives of this test are:

- Monitor the status of non-communication related hardware and software.
- Monitor system performance through the management of performance thresholds.
- Evaluate system fault isolation and response mechanisms.
- Evaluate configuration management of procedures and policies.

Applicability

This test will be performed at the EDF.

Requirements Verified

The following requirements will be verified upon completion of this test:

REQ ID	Requirement Text	Requirement Criticality
EOSD3200	A minimum of one backup which is maintained in a separate physical location (i.e., different building) shall be maintained for ECS software.	Mission Essential
SMC-3300	The SMC shall monitor site and element hardware, and scientific and system software status to determine their operational states including, at a minimum: a._On-line b._Failed	Mission Essential
SMC-3305	The LSM shall monitor its elementÕs hardware, and scientific and system software status to determine their operational states including, at a minimum : a._On-line b._Failed	Mission Essential
SMC-3370	For each performance parameter, the SMC shall have the capability of establishing multiple levels of thresholds to include, at a minimum: a._On/off b._Pass/fail c._Various levels of degradation	Mission Essential
SMC-3375	For each limit checked parameter, the LSM (including those thresholds directed by the SMC) shall have the capability of evaluating multiple levels of thresholds including, at a minimum: a._On/off b._Pass/fail	Mission Essential
SMC-3380	The SMC shall evaluate overall system performance.	Mission Essential
SMC-3390	The SMC shall generate alert indicators of fault or degraded conditions.	Mission Essential
SMC-3395	The LSM shall generate, in response to each limit check threshold, alert indicators of fault or degraded conditions with the appropriate corrective actions	Mission Essential

REQ ID	Requirement Text	Requirement Criticality
SMC-3415	The LSM shall perform short and long-term trend analysis of element performance, including, at a minimum: a._Operational status b._Performance of a particular resource c._Maintenance activities (e.g., number of repairs per item)	Mission Essential
SMC-4305	The LSM shall maintain fault management policies and procedures for its element.	Mission Essential
SMC-4310	The SMC shall perform fault analysis including, at a minimum: a._Isolation b._Location c._Identification d._Characterization	Mission Essential
SMC-4311	he SMC shall have the capability to perform fault analysis to the level of, at a minimum: a._Subsystem b._Equipment	Mission Essential
SMC-4320	SMC shall support fault diagnosis testing to include, at a minimum: b._Resource-to-resource connectivity testing	Mission Essential
SMC-4325	The LSM shall request fault diagnosis testing be performed, including, at a minimum: b._Resource-to-resource connectivity testing within its element	Mission Essential
SMC-8840	The SMC shall have the capability to generate detailed and summary reports indicating the performance of ground resources, including, at a minimum: c._Resource utilization	Mission Essential

Test Configuration

- Hardware: MSS Server.
- Software: MCI, INCI, DCCI CSCIs.
- Test Tools: **TBD**.

Support Requirements

a. Personnel

- 1 IV&V.
- 1 ECS M&O.

b. Test Data Descriptions

　　　None.

Test Cases

SFT02.1: System Hardware Status Monitoring

This test case addresses the system capability to monitor both local and remote hardware within the DCE cell. The following scenarios will be tested:

Scenario	Description	Acceptance Criteria
1	Display status for local hardware (at SMC).	Status displayed.
2	Display status for remote hardware at each of the DAACs.	Status displayed.
3	Place a local hardware unit (i.e. server) offline and verify status update.	Status updated for affected unit.
4	Contact remote DAAC and request that remote hardware unit (TBD) be placed offline. Verify change of status in the display.	Status updated for affected unit.

Acceptance Criteria:

- System provides a graphical display of system hardware, both local and remote.
- System updates the status of hardware components as required.

SFT02.2: System Software Status Monitoring

This test addresses monitoring of software both at the SMC and DAACs. The system provides the capability to view software currently operating within the systems and their current status. Scenarios to be tested are:

Scenario	Description	Acceptance Criteria
1	Display status for local software component (at SMC).	Status displayed.
2	Display status for remote software components at each of the DAACs.	Status displayed.
3	Suspend a local software component (i.e. Ingest software) and verify status update.	Status updated for affected unit.
4	Contact remote DAAC and request that remote software component (TBD) be suspended. Verify change of status in the display.	Status updated for affected unit.

Acceptance Criteria:

- System allows operators to monitor software both locally and at the DAACs
- System detects a change of status for a software unit and updates status display.

SFT02.3: System Performance Management

This test addresses the monitoring of system performance through the use of system thresholds. Scenarios to be tested are:

Scenario	Description	Acceptance Criteria
1	Display of currently available system thresholds and resources.	Thresholds/resources displayed.
2	Update of an existing system threshold to a value that would trigger an event.	Treshold updated, threshold violation detected.
3	Update threshold value to: On/off. Pass/fail. Various levels of deradation.	Threshold updated, violation corrected.
4	Generate a report for system thresholds to evaluate performance.	Report generated.
5	Generate a resource utilization report.	Report generated.

Acceptance Criteria:

- System thresholds can be viewed and updated as required.
- System enforces thresholds set by the operators.
- System provides reports to evaluate system performance.

SFT02.4: Policies and Procedure Management

This test case addresses the availability and management of system procedures and policies at the SMC. Scenarios to be tested are:

Scenario	Description	Acceptance Criteria
1	Display list of currently available policies and procedures.	List displayed.
2	View a selected procedure via online means.	Procedure available for review.
3	Print a selected procedure.	Procedure printed.

Acceptance Criteria:

- Procedures and policies will be maintained at the SMC.
- Procedures and policies will be available for viewing and printing.

SFT02.5: Fault Isolation and Response

This test case demonstrates the capability to detect faults within the system. It also determines if the correct responses are generated. Scenarios to be tested are:

Scenario	Description	Acceptance Criteria
1	Simulate a threshold out of limit condition.	Event detected and logged, alarm generated.
2	Simulate a hardware device unavailability and execute fault diagnosis testing.	Event detected and logged, alarm generated.
3	Simulate a stalled print queue.	Event detected and logged, alarm generated.
4	Simulate a hardware device unavailable at a DAAC and execute fault diagnosis testing.	Event detected and logged, alarm generated.
5	Simulate a software component failure or termination.	Event detected and logged, alarm generated.

Acceptance Criteria:

- System will detect abnormal conditions and will trigger appropriate responses.
- System will isolate, locate and perform fault identification and characterization.
- System logs will be accessed to evaluate the events and the system responses.

SFT02.6: System Backup Availability

This test case addresses the procedures associated with system backups. It will also check the availability of a backup for recovery purposes.

Acceptance Criteria: Backup procedures are followed and backup copy is maintained at another location.

SFT03 - System Access & Connectivity

Test Objectives

This test verifies the capability of ECS at each site and the SMC to access the Version 0 (V0) LAN and WAN and use its capabilities. Specific objectives to be tested are:

- V0 LAN and WAN access.
- Protocol verification.
- File and electronic message transfer.

Applicability

This test will be performed both at the EDF and DAACs. Test cases will be scheduled multiple times for the various data files and messages to be sent to the DAACs. Refer to site sequence for specific scheduling information.

Requirements Verified

The following requirements will be verified upon completion of this test:

REQ ID	Requirement Text	Requirement Criticality
EOSD0500	_ECS shall perform the following major functions: d._Communications and Networking e._Data Input f._Data Processing	Mission Essential
EOSD0730	Each ECS element shall be capable of verifying the fidelity of the ECS element interface to: b._Entities external to ECS at any time during the lifetime of the ECS	Mission Essential
ESN-0003	The ESN shall enable researchers on existing networks (TCP/IP and GOSIP) to gain access to data and ECS services in a transparent manner to the underlying differences between the networks.	Mission Essential
ESN-0010	ESN shall provide the following standard services: a._Data Transfer and Management Services b._Electronic Messaging Service c._Remote Terminal Service d._Process to Process Communication Service e._Directory and User Access Control Service f._Network Management Service g._Network Security and Access Control Service h._Internetwork Interface Services	Mission Essential
ESN-0070	The ESN shall support the elements data flow requirements identified in this specification.	Mission Essential
ESN-0280	The ESN shall provide file transfer and management service and as a minimum shall include the capability to transfer the following data types: a._Unstructured Text b._Binary Unstructured c._Binary Sequential d._Sequential Text	Mission Essential
ESN-0290	The file transfer and management service shall be available in interactive and non-interactive services.	Mission Essential
ESN-0370	The ESN shall provide interactive virtual terminal services.	Mission Essential
ESN-1140	The ESN shall provide protocol translation, termination, bridging and routing.	Mission Essential

REQ ID	Requirement Text	Requirement Criticality
ESN-1170	The ESN shall provide necessary translation within supported file transfer and e-mail services.	Mission Essential
ESN-1180	The ESN shall interoperate with NSI to provide user access to ECS.	Mission Essential
ESN-1340	The ESN shall provide support for TCP/IP communications protocols and services to external interfaces as required by the IRDs.	Mission Essential
ESN-1350	The ESN LANs shall provide physical devices and the corresponding medium access control (MAC) protocol compatible with ISO and ANSI standards.	Mission Essential

Test Configuration

- Hardware: V0 LAN at each site, V0 WAN access, MSS server, printer (local and remote).
- Software: DCCI, INCI, MCI CSCIs.
- Test Tools: **TBD**.

Support Requirements

a. Personnel

- 1 IV&V at MSS server.
- 1 ECS M&O at MSS server.
- 1 IV&V at separate DAAC (Test Case SFT03.2, SFT03.4, SFT03.5 only).

b. Test Data Descriptions

    None.

Test Cases

SFT03.1: LAN Access

This test case addresses access to the LAN. The standard sequence to be executed involves the following steps:

- Logon to the local server.
- Send report/file to the local printer.
- Verify that the report/file was sent to the printer.

The following scenarios will be tested as part of this test case:

Scenario	Description	Acceptance Criteria
1	Valid Logon.	Successful logon.
2	Invalid Logon.	No connection made.
3	Report/File sent to printer.	Successful printout.

Acceptance Criteria:

- The system logon attempt was successful and the report/file was issued at the printer.
- System shall detect error conditions and will log events in the system.

SFT03.2: WAN Access

This test case addresses access to the WAN. The standard sequence to be executed involves the following steps:

- Logon to a remote host from the local host.
- Send report/file to the remote host printer from the local host.
- Verify that the report/file was sent to the printer.

The following scenarios will be tested as part of this test case:

Scenario	Description	Acceptance Criteria
1	Valid Logon to remote host.	Successful logon.
2	Invalid Logon to remote host.	No connection made.
3	Report/File sent to printer.	Successful print out.

Acceptance Criteria:

- The system logon attempt was successful and the report/file was issued at the printer.
- System shall detect error conditions and will appropriately respond and log events in the system.

SFT03.3: Protocol Verification

This test case addresses the verification of the protocols to be used by performing inspections. The standard sequence to be executed involves the following steps:

- Inspect the available physical hardware.
- Inspect the available documentation and IRDs.

Acceptance Criteria:

- Insure that there is compatibility between the physical devices and the corresponding medium access control (MAC) with ISO and ANSI standards.
- Insure that TCP/IP communications protocols and services as required by external elements are supported.

SFT03.4: File Transfer

This test case addresses SMC TO DAAC transfer of files via ftp, and rcp. The standard sequence to be executed involves the following steps:

- Logon to remote DAAC host from local host.
- Send file to the remote DAAC host from the local host.
- Remote DAAC sends file back to the local host.
- Verify that the files were received at the remote DAAC host.
- Verify that the files were received at the local host.

The following scenarios will be tested as part of this test case:

Scenario	Description	Acceptance Criteria
1	ASCII file (ftp) sent/received to/from remote host.	Successful transmission of files.
2	Binary file (ftp) sent/received to/from remote host.	Successful transmission of files.
3	Data file (rcp) sent to remote host.	Successful transmission of file.

Acceptance Criteria:

- The successful transmission of the file (ftp/rcp).
- Checksum of the data file sent from one host to the other shall be equivalent.

SFT03.5: Electronic Messages

This test case addresses DAAC TO DAAC transfer of electronic messages. The standard sequence to be executed involves the following steps:

- Send electronic message (non-email) to remote host.
- Send electronic message (email) to remote host.
- Verify that both electronic messages were received at remote host.

The following scenarios will be tested as part of this test case:

Scenario	Description	Acceptance Criteria
1	Electronic mail with return receipt requested was sent to remote host.	Successful transmission and receipt of Email.
2	Transmission check was sent to the operator at the remote host.	Successful transmission of request and notification sent back to original DAAC operator.

Acceptance Criteria: The successful transmission and confirmation of electronic messages.

SFT04 - System Security Administration

Test Objectives

This test verifies the system capability to define various levels of users and authenticate the associated privileges. Specific objectives to be tested are:

- Manage users through the use of the security registry.
- Specify and implement user groups.
- Authenticate and enforce user privileges and access.

Applicability

This test will be performed at the EDF and all DAACs.

Requirements Verified

The following requirements will be verified upon completion of this test:

REQ ID	Requirement Text	Requirement Criticality
ESN-0010	ESN shall provide the following standard services: a._Data Transfer and Management Services b._Electronic Messaging Service c._Remote Terminal Service d._Process to Process Communication Service e._Directory and User Access Control Service f._Network Management Service g._Network Security and Access Control Service h._Internetwork Interface Services	Mission Essential
ESN-0650	The ESN shall perform the following network management functions for each protocol stack implemented in any ECS element, and each communications facility: a._Network Configuration Management b._Network Fault Management c._Network Performance Management d._Network Security Management	Mission Essential
SMC-5320	The SMC shall establish, maintain, and authenticate access privileges for ECS scientific users.	Mission Essential
SMC-5325	The LSM shall promulgate, maintain, authenticate, and monitor user and device accesses and privileges.	Mission Essential
SMC-5330	The SMC shall provide support, manage, maintain, and request security testing that includes, at a minimum, password checking.	Mission Essential
SMC-5335	The LSM shall perform security testing that includes, at a minimum, password auditing and element internal access/privileges checking.	Mission Essential
SMC-5365	The LSM shall generate recovery actions in response to the detection of compromises.	Mission Essential
SMC-8880	The SMC shall have the capability to generate detailed and summary security compromise reports indicating security compromises of ground resources and facilities, including, at a minimum: a._Security compromise type and description b._Time of occurrence	Mission Essential

Test Configuration

- Hardware: MSS Server.
- Software: DCCI, INCI CSCIs.
- Test Tools: **TBD**.

Support Requirements

a. Personnel

- 1 IV&V TC at MSS Server.
- 1 ECS M&O at MSS Server.

b. Test Data Descriptions

    None.

Test Cases

SFT04.1: User Account Management

This test case addresses the management of user accounts through the security registry. The standard sequence to be executed involves the following steps:

- View the security registry.
- Manage user accounts (add/delete/modify).

The following scenarios will be tested:

Scenario	Description	Acceptance Criteria
1	Invoke the user registry and print user account information.	Registry accessed,user information obtained
2	Create the following test accounts: **TBD**.	Accounts successfully created.
3	Delete test account **TBD** from the registry.	Account deleted.
4	Modify test account **TBD**.	Account modified.

Acceptance Criteria: User accounts successfully managed through the user registry.

SFT04.2: User Group Specification

This test case addresses the management of user groups within the system. These groups will be created and managed via the user registry.

The following scenarios will be tested as part of this test case:

Scenario	Description	Acceptance Criteria
1	View defined user groups within the system with associated privileges/access.	User groups accessed through the security registry.
2	Add a new user group to the system.	User group added.
3	Associate **TBD** accounts created in test case SFT04.1 to the user group.	Accounts linked to the user group.

Acceptance Criteria:

- User group created and managed through the security registry.
- User accounts successfully allocated to a defined user group.

SFT04.3: User Privilege Authentication

This test case ensures that the specified user privileges are implemented by the system. This test case involves the following activities:

- Logging on with accounts of various privileges.
- Attempting both authorized and unauthorized activities.

The scenarios to be tested are as follows:

Scenario	Description	Acceptance Criteria
1	Logon to the system with a test account with **TBD** privileges.	Logon successful.
2	Perform authorized operations.	Operations performed successfully.
3	Perform unauthorized operations.	Operations not allowed within the system.

Acceptance Criteria: System allows users to perform authorized operations and restricts users from performing unauthorized operations.

SFT04.4: Security Fault Detection and Response

This test cases addresses the detection and response to unauthorized access to the system. This test case involves the following activities:

- Attempt invalid logins to the system.
- Verify system detection of invalid login attempts.
- Verify system response to security compromise, including logging of events, and report generation.

The scenarios to be tested are as follows:

Scenario	Description	Acceptance Criteria
1	Attempt several invalid logins locally.	Attempts detected and logged.
2	Attempt an invalid login at a remote host from local system.	Attempts detected and logged.
3	Review system security log and generate reports detailing invalid activities.	Events logged and report generated with specified data.

Acceptance Criteria:

- Invalid logins prevented by system, both locally and remotely.
- Event information logged and retrieved for analysis. Reports available for inspection.

SFT05 - DAAC Operations and Administration

Test Objective

This test addresses the operation and administration of site hardware and software, including performance monitoring. Specific objectives of this test are:

- Monitor the status of non-communication related hardware and software.
- Monitor system performance through the management of performance thresholds.
- Evaluate system fault isolation and response mechanisms.
- Evaluate configuration management of procedures and policies.

For IR-1, most of these capabilities are controlled from the SMC functions at the EDF since no LSM is available at the sites. These test cases will be performed in conjunction with personnel at the EDF to verify the capability to manage the DAACs remotely from that facility.

Applicability

This test will be performed at each of the DAACs with support from EDF.

Requirements Verified

The following requirements will be verified upon completion of this test:

REQ ID	Requirement Text	Requirement Criticality
ESN-0010	ESN shall provide the following standard services: a._Data Transfer and Management Services b._Electronic Messaging Service c._Remote Terminal Service d._Process to Process Communication Service e._Directory and User Access Control Service f._Network Management Service g._Network Security and Access Control Service h._Internetwork Interface Services	Mission Essential
ESN-0070	The ESN shall support the elements data flow requirements identified in this specification.	Mission Essential
ESN-0840	The ESN shall have error reporting and event logging.	Mission Essential
ESN-0910	The ESN fault management shall provide the capability to perform the following functions, at a minimum, both locally and at the ESN network management facility: c._enable and disable event reports within a system d._manage error and event logging files	Mission Essential
SDPS0010	The SDPS shall provide CSMS with operational, and data processing, data quality status.	Mission Essential
SMC-3300	The SMC shall monitor site and element hardware, and scientific and system software status to determine their operational states including, at a minimum: a._On-line b._Failed	Mission Essential
SMC-3305	The LSM shall monitor its elements hardware, and scientific and system software status to determine their operational states including, at a minimum : a._On-line b._Failed	Mission Essential

REQ ID	Requirement Text	Requirement Criticality
SMC-3375	For each limit checked parameter, the LSM (including those thresholds directed by the SMC) shall have the capability of evaluating multiple levels of thresholds including, at a minimum: a._On/off b._Pass/fail	Mission Essential
SMC-3395	The LSM shall generate, in response to each limit check threshold, alert indicators of fault or degraded conditions with the appropriate corrective actions.	Mission Essential
SMC-3415	The LSM shall perform short and long-term trend analysis of element performance, including, at a minimum: a._Operational status b._Performance of a particular resource c._Maintenance activities (e.g., number of repairs per item)	Mission Essential
SMC-4305	The LSM shall maintain fault management policies and procedures for its element.	Mission Essential
SMC-4310	The SMC shall perform fault analysis including, at a minimum: a._Isolation b._Location c._Identification d._Characterization	Mission Essential
SMC-4311	The SMC shall have the capability to perform fault analysis to the level of, at a minimum: a._Subsystem b._Equipment	Mission Essential
SMC-4315	_The LSM shall, at a minimum, isolate, locate, and identify faults, identify subsystem, equipment, and software faults, and identify the nature of the faults within its element.	Mission Essential
SMC-4325	The LSM shall request fault diagnosis testing be performed, including, at a minimum: b._Resource-to-resource connectivity testing within its element	Mission Essential

Test Configuration

- Hardware: V0 WAN access, MSS Server.
- Software: DCCI, MCI, INCI CSCIs.
- Test Tools: **TBD**.

Support Requirements

a. Personnel

- 1 IV&V TC.
- 1 ECS M&O at DAAC.
- 1 ECS M&O at EDF.

b. Test Data Descriptions

None.

Test Cases

SFT05.1: DAAC Hardware Status Monitoring

This test case addresses the system capability to monitor DAAC hardware within the DCE cell. The following scenarios will be tested:

Scenario	Description	Acceptance Criteria
1	Display status for DAAC hardware (obtain printout from SMC).	Status displayed.
2	Place a local hardware unit (i.e. server) offline and verify status update. Verify with SMC.	Status updated for affected unit.

Acceptance Criteria:

- System provides a graphical display of DAAC hardware at the SMC.
- System updates the status of hardware components as required.

SFT05.2: DAAC Software Status Monitoring

This test addresses monitoring of software at the DAACs. The system provides the capability to view software currently operating within the systems and their current status. Scenarios to be tested are:

Scenario	Description	Acceptance Criteria
1	Display status for local software component. Verify with SMC.	Status displayed.
2	Suspend a local software component (i.e. Ingest software) and verify status update. Verify with SMC.	Status updated for affected unit.

Acceptance Criteria:

- System allows operators to monitor software at the DAACs via the SMC.
- System detects a change of status for a software component and updates status display.

SFT05.3: System Performance Management

This test addresses the monitoring of DAAC performance through the use of system thresholds. Scenarios to be tested are:

Scenario	Description	Acceptance Criteria
1	Display of currently available system thresholds for the DAAC. Obtain report from SMC.	Thresholds displayed.
2	Update of an existing system threshold to a value that would trigger an event.	Treshold updated, threshold violation detected.
3	Update threshold value to nominal level.	Threshold updated, violation corrected.
4	Generate a report for system thresholds to evaluate performance (via SMC).	Report generated.

Acceptance Criteria:

- System thresholds can be viewed and updated as required.
- System enforces thresholds set by the operators.
- System provides reports to evaluate system performance.

SFT05.4: Policies and Procedure Management

This test case addresses the availability and management of system procedures and policies at the DAACs. Scenarios to be tested are:

Scenario	Description	Acceptance Criteria
1	Display list of currently available policies and procedures.	List displayed.
2	View a selected procedure via online means.	Procedure available for review.
3	Print a selected procedure.	Procedure printed.

Acceptance Criteria:

- Procedures and policies will be maintained at the DAAC.
- Procedures and policies will be available for viewing and printing.

SFT05.5: Fault Isolation and Response

This test case demonstrates the capability to detect faults within the system. It also determines if the correct responses are generated. Scenarios to be tested are:

Scenario	Description	Acceptance Criteria
1	Simulate a threshold out of limit condition.	Event detected and logged, alarm generated.
2	Simulate a hardware device unavailability.	Event detected and logged, alarm generated.
3	Simulate a stalled print queue.	Event detected and logged, alarm generated.
4	Simulate a software component failure or termination.	Event detected and logged, alarm generated.

Acceptance Criteria:

- System will detect abnormal conditions and will trigger appropriate responses.
- System logs will be accessed to evaluate the events and the system responses.

SFT06 - ECS Standard Services

Test Objectives

This test verifies the availability of system standard services on the various system workstations. Specific objectives to be tested are:

- Availability of SDP Toolkit at AI&T workstation.
- Availability of Standard Services at the user workstation.

Applicability

This test will be performed at the SMC and all DAACs.

Requirements Verified

The following requirements will be verified upon completion of this test:

REQ ID	Requirement Text	Requirement Criticality
EOSD0502	ECS shall provide an integrated set of toolkits consisting of software tools for each ECS element	Mission Essential
ESN-0010	ESN shall provide the following standard services: a._Data Transfer and Management Services b._Electronic Messaging Service c._Remote Terminal Service d._Process to Process Communication Service e._Directory and User Access Control Service f._Network Management Service g._Network Security and Access Control Service h._Internetwork Interface Services	Mission Essential
ESN-1170	The ESN shall provide necessary translation within supported file transfer and e-mail services.	Mission Essential

Test Configuration

- Hardware: AI&T Workstation, Ingest Workstation
- Software: SDPTK, DCCI CSCIs.
- Test Tools: None.

Support Requirements

a. Personnel

- 1 IV&V.
- 1 ECS M&O.

b. Test Data Descriptions

None.

Test Cases

SFT06.1: SDP Toolkit Availability

This test case verifies the availability of standard toolkit services at the user workstations. The following scenarios and services will be accessed:

Scenario	Description	Acceptance Criteria
1	Access Available Compilers.	Compilers accessed.
2	Access File Comparison Utility.	Utility accessed.
3	Access both dynamic and static code checkers.	Tools accessed.
4	Access document viewing tools.	Tool accessed.
5	Access product visualization/graphics tool.	Tool accessed.

Acceptance Criteria: The specified services are accessed through the workstation.

SFT06.2: ECS Standard Services Availability

This test case verifies the availability of ECS standard services at the user workstations. The following scenarios and services will be accessed:

Scenario	Description	Acceptance Criteria
1	Access Email services.	Services accessed.
2	Access Bulletin Board Services.	Service accessed.
3	Access Internet.	Internet accessed.
4	Invoke virtual terminal services.	Terminal services accessed.

Acceptance Criteria: The specified services are accessed through the workstation.

APPENDIX A: MATRIX OF IR-1 LEVEL 3 REQUIREMENTS BY RELEASE TO IDENTIFIED TESTS

L3 Requirements to AT Test Traceability and Verification							
Paragraph ID	**Requirement Text**	**Clarification**	**Test ID**	**Verif. Method**			
				I	**A**	**D**	**T**
DADS0130	Each DADS shall receive from the SDPF, at a minimum, the following: a. Production data (L0)	Receive TRMM (CERES & LIS) L0. Applies only to ingest and temporary storage for testing purposes only.	EXT01.1 EXT01.2				X
DADS0145	Each DADS shall be capable of receiving from the ADCs, at a minimum, the following for the purpose of product generation: b. Metadata c. Ancillary data						X
DADS0170	Each DADS shall be capable of receiving from designated EPDSs and ODCs, at a minimum, the following: a. L0-L4 data sets b. Metadata	IR-1: This requirement is supported as follows: IR-1 shall be capable of receiving and temporary storage of data from TSDIS for the purpose of testing the TSDIS interface to the Ingest subsystem.	EXT02.1				X
DADS0190	Each DADS shall receive from the SCF, at a minimum, the following: g. Algorithms	IR-1: This requirement is supported as follows: IR-1 shall provide the capability for the SCF to transfer to the AITTL CI via ftp.	CFT01.1				X
DADS0250	Each DADS shall receive, at a minimum, data in the following forms: b. Electronic communications network	IR-1: This requirement is supported as follows: IR-1 shall have the capability to receive data via an electronic communications network for the purpose of testing external interfaces to the Ingest subsystem.	EXT01.1 EXT02.1 EXT03.1				X
DADS0260	Each DADS shall receive non-EOS correlative and ancillary digital data.	IR-1: This requirement is supported as follows: IR-1 shall have the capability to receive data from NOAA for the purpose of testing the NOAA interface to the Ingest subsystem.	EXT03.1				X

L3 Requirements to AT Test Traceability and Verification

Paragraph ID	Requirement Text	Clarification	Test ID	Verif. Method			
				I	A	D	T
DADS1070	The DADS shall send data check and storage status to the provider of ingest data.	IR-1: This requirement is supported as follows: IR-1 shall report errors and status to TSDIS and SDPF in support of the testing of the ingest interfaces with TSDIS and SDPF.	EXT01.1 EXT01.2 EXT02.1				X
DADS1380	Each DADS shall monitor data transfer between external (non-ECS) elements and the DADS.	IR-1: This requirement is supported as follows: IR-1 shall report errors and status to external elements in support of the testing of the data transfer interfaces with those elements.	EXT01.1 EXT01.2 EXT02.1				X
DADS1400	Each DADS shall notify the originating source of the need to retransmit data in the event of transmission difficulties.	Applies only to ingest of TRMM data only.	EXT01.1 EXT02.1				X
EOSD0500	ECS shall perform the following major functions: d. Communications and Networking e. Data Input f. Data Processing	IR-1: IR-1 shall perform the following major functions: 1. Communications and networking utilizing existing VO networks. 2. Data input for the purpose of testing TRMM, NESDIS and DAO ingest interfaces. 3. Science software Integration and Test.	CFT012 EXT01.1 EXT02.1 EXT02.2 EXT03.1 SFT03.1 SFT03.2				X
EOSD0502	ECS shall provide an integrated set of toolkits consisting of software tools for each ECS element.	IR-1: This requirement is supported as follows: IR-1 shall provide a PGS Toolkit and common CCS communication software.	CFT02.1 SFT06.1			X	
EOSD0510	ECS shall be capable of being tested during all phases of its development .	IR-1: Applies only to the functions provided in this release.	INT02.1 INT02.2			X	
EOSD0730	Each ECS element shall be capable of verifying the fidelity of the ECS element interface to: b. Entities external to ECS at any time during the lifetime of the ECS		CFT01.1 EXT01.1 EXT02.1 SFT03.3	X			
EOSD0780	Each ECS element shall be capable of being monitored during testing.		INT02.1 INT02.2			X	
EOSD1607	ECS shall receive data from near term Earth Probe missions to include the following as a minimum: a). TRMM data for temporary storage for testing purposes only.	IR-1: Applies only to ingest and temporary storage for testing purposes only (not archiving) of TRMM data.	EXT01.1 EXT01.2 EXT01.3 EXT02.1 EXT02.3				X

Paragraph ID	Requirement Text	Clarification	Test ID	Verif. Method I	A	D	T
L3 Requirements to AT Test Traceability and Verification							
EOSD1608	ECS elements shall receive from EPDSs the following at a minimum: a. Data products e. Metadata		EXT01.1 EXT02.1				X
EOSD1703	ECS shall provide maintenance and operations interfaces to the DAACs to support the functions of: b). Science Algorithm Integration	IR-1: IR-1 shall provide a GUI interface for displaying the operational state of managed objects in the AITTL CI.	CFT01.4				X
EOSD1710	ECS elements shall exchange with ADCs/ODCs, such as NOAA and other data processing and archiving facilities, information including the following: d. Science Data		EXT03.1				X
EOSD1750	ECS elements shall receive data including the following types of supporting information from the ECS science community (TLs, TMs, PIs, and Co-Is): a. Algorithms b. Software fixes d. Integration support requests	IR-1: Applies only to TRMM and AM-1 algorithms and algorithm I&T.	CFT01.1				X
EOSD1760	The ECS elements shall send the following types of data at a minimum to the ECS science community (TLs, TMs, PIs, and Co-Is): a. Software Problem Reports	IR-1: Applies only to TRMM and AM-1 algorithms.	CFT01.4				X
EOSD3200	A minimum of one backup which is maintained in a separate physical location (i.e., different building) shall be maintained for ECS software.		SFT02.7	X			
EOSD5020	ECS software, hardware, and interfaces shall enable transparent portability across heterogeneous site architectures, i.e. performing the same function at different ECS sites that may have different hardware implementations.	IR-1: Applies only to TRMM data ingest and algorithm I&T.	CFT01.4 EXT01.1 EXT01.2 EXT02.3 EXT02.4				X
ESN-0003	The ESN shall enable researchers on existing networks (TCP/IP and GOSIP) to gain access to data and ECS services in a transparent manner to the underlying differences between the networks.	IR-1: V0 Network where possible; NSI otherwise A: Applicable (w/0 GOSIP requirement and minimum connectivity to network for ftp to AI&T.)	SFT03.4				X
ESN-0006	ESN shall interface with NSI to reach all external non-ECS network-attached facilities and science users.	IR-1:_TRMM and AM1 to SCFs	CFT01.1				X

L3 Requirements to AT Test Traceability and Verification

Paragraph ID	Requirement Text	Clarification	Test ID	Verif. Method			
				I	A	D	T
ESN-0010	ESN shall provide the following standard services: a. Data Transfer and Management Services b. Electronic Messaging Service c. Remote Terminal Service d. Process to Process Communication Service e. Directory and User Access Control Service f. Network Management Service g. Network Security and Access Control Service h. Internetwork Interface Services	IR-1: a through h a. ftp, etc. b. mail c. telnet d. internal within a site. Issue on Network security and Access Control Service - item g? Question: Item d. applicability; Carey Gire will check on this???	SFT01.1 SFT01.2 SFT01.3 SFT03.1 SFT03.2 SFT03.4 SFT03.5 SFT04.1 SFT04.2 SFT04.3 SFT04.4 SFT05.3 SFT06.2				X
ESN-0070	The ESN shall support the elements data flow requirements identified in this specification.		EXT01.1 SFT01.1 SFT01.2 SFT01.3 SFT03.2 SFT03.3 SFT03.4 SFT03.5 SFT05.3 SFT05.5		X		
ESN-0210	The ESN management function shall have a capability to obtain status on specific data flows to assure the successful operation of ESN.		SFT01.1				X
ESN-0280	The ESN shall provide file transfer and management service and as a minimum shall include the capability to transfer the following data types: a. Unstructured Text b. Binary Unstructured c. Binary Sequential d. Sequential Text		SFT03.4				X
ESN-0290	The file transfer and management service shall be available in interactive and non-interactive services.		SFT03.4				X
ESN-0370	The ESN shall provide interactive virtual terminal services.	IR-1:_Total applicability	SFT03.2				X
ESN-0620	The ESN shall include a network management function to monitor and control the ESN.		SFT01.1 SFT01.2 SFT01.3				X
ESN-0640	The ESN shall include management functions at each ECS element, equipment or gateway within the ESN.		SFT01.1 SFT01.2				X

Paragraph ID	Requirement Text	Clarification	Test ID	Verif. Method			
				I	A	D	T
ESN-0650	The ESN shall perform the following network management functions for each protocol stack implemented in any ECS element, and each communications facility: a. Network Configuration Management b. Network Fault Management c. Network Performance Management d. Network Security Management		SFT01.1 SFT01.2 SFT01.3 SFT04.1 SFT04.2 SFT04.3 SFT04.4			X	
ESN-0740	The ESN network management service shall retrieve performance/fault data about ESN protocol stacks and equipment.	IR-1:_Total applicability	SFT01.3			X	
ESN-0760	The ESN report generation function shall provide, on an interactive and scheduled basis, network configuration, fault and performance management information.	IR-1:_interactive basis only.	SFT01.1 SFT01.2 SFT01.3			X	
ESN-0775	The ESN management service shall have the capability to redirect its reports to different devices such as console, disk or printer.	IR-1:_Total applicability	SFT01.1 SFT01.2			X	
ESN-0790	The ESN shall include the following configuration management functions at a minimum: a. collect information describing the state of the network subsystem and its communications resources, b. exercise control over the configuration, parameters, and resources of the subsystem, and over the information collected, c. store the configuration information collected, and d. display the configuration information.	As supported by V0 devices and policy. Otherwise not an IR-1 requirement.	SFT01.1 SFT01.2			X	
ESN-0800	The ESN shall be capable of displaying the local network configuration status related to each system locally, and for all systems at the ESN network management facility.	IR-1:_Network Mgmt Facility @ EDF	SFT01.1				X
ESN-0830	The ESN shall have the capability to detect and report communications related errors and events both locally and at the ESN network management facility.		SFT01.3				X
ESN-0840	The ESN shall have error reporting and event logging.		SFT01.3 SFT05.5				X

L3 Requirements to AT Test Traceability and Verification

Paragraph ID	Requirement Text	Clarification	Test ID	Verif. Method			
				I	A	D	T
ESN-0900	Errors and events to be detected shall include at least: b. communications hardware errors c. protocol errors d. performance degradation conditions e. telecommunications errors and failures		SFT01.3				X
ESN-0910	The ESN fault management shall provide the capability to perform the following functions, at a minimum, both locally and at the ESN network management facility: c. enable and disable event reports within a system d. manage error and event logging files	IR-1:_c and d	SFT01.2 SFT05.3				X
ESN-1060	The ESN performance management function shall provide the capability to evaluate the performance of ESN resources and interconnection activities.	IR-1:_Total applicability	SFT01.1 SFT01.2			X	
ESN-1070	The ESN shall provide the capability to perform the following functions, at a minimum: a. generate/collect network statistics b. control collection/generation of network statistics c. store system statistics and statistical histories d. display the system statistics	IR-1:_a through d. TBD?	SFT01.1			X	
ESN-1140	The ESN shall provide protocol translation, termination, bridging and routing.		SFT03.2 SFR03.3			X	
ESN-1170	The ESN shall provide necessary translation within supported file transfer and e-mail services.		SFT03.4 SFT03.5 SFT06.2			X	
ESN-1180	The ESN shall interoperate with NSI to provide user access to ECS.		SFT03.2				X
ESN-1340	The ESN shall provide support for TCP/IP communications protocols and services to external interfaces as required by the IRDs.		SFT03.3 SFT03.4				X
ESN-1350	The ESN LANs shall provide physical devices and the corresponding medium access control (MAC) protocol compatible with ISO and ANSI standards.		SFT03.3		X		

L3 Requirements to AT Test Traceability and Verification

Paragraph ID	Requirement Text	Clarification	Test ID	Verif. Method I	A	D	T
PGS-0270	The PGS shall provide the capability to perform the following functions, at a minimum: b. Suspend execution of tasks c. Resume execution of a suspended task d. Cancel execution of tasks	IR-1: Item b, c and d applicable to the extent that Unix commands or COTS can support execution operations.	CFT02.1				X
PGS-0360	The PGS shall generate a PGS processing log that accounts for all data processing activities.	IR-1: This requirement is supported as follows: IR-1 shall provide the capability to record science processing event and history data to a log file, by means of both the SDP Toolkit and the CSS event logger service.	CFT02.1				X
PGS-0370	The PGS shall utilize the LSM to generate a PGS resource utilization report.	IR-1: This requirement is supported as follows: IR-1 shall provide resource monitoring and reporting capabilities using the management framework at the EDF. IR-1 does not provide an LSM.	CFT02.1				X
PGS-0400	The PGS shall have the capability to monitor the status of all algorithm and calibration coefficient testing and generate algorithm and calibration test reports.	IR-1 Total Applicability	CFT01.4				X
PGS-0430	The PGS shall utilize the LSM to monitor and account for data and information transfer between it and other EOSDIS elements.	IR-1: This requirement is supported as follows: IR-1 shall provide network monitoring capabilities using the management framework at the EDF. IR-1 does not provide an LSM.	SFT01.1 SFT01.2			X	
PGS-0490	The PGS shall have the capability to access and use, for the generation of Standard Products, information such as: a. Digital terrain map databases b. Land/sea databases c. Climatology databases d. Digital political map databases		CFT02.1			X	
PGS-0602	The PGS shall have the capability to accept POSIX-compliant science algorithms and compile algorithm source code written in a standard programming language (e.g., Fortran, C, Ada).	IR-1: External Interface Requirement SCF-0010.	CFT01.2				X

L3 Requirements to AT Test Traceability and Verification

Paragraph ID	Requirement Text	Clarification	Test ID	Verif. Method I	A	D	T
PGS-0610	The PGS shall accept from the SCFs new or modified calibration coefficients to be validated in the test environment. Calibration coefficients shall contain the following information at a minimum: a. Identification of coefficient data set b. Calibration coefficients values c. Author and version number d. Identification of related processing algorithm e. Start and stop date/time of applicability f. Date and time g. SCF identification h. Reasons for update	IR-1: Applies to accepting information only, not using it. The Dataserver is incorporated in Release A. Dataserver is not available at IR-1.	CFT01.1				X
PGS-0620	The PGS shall have the capability to validate received calibration coefficients for completeness and correct format.	IR-1 TRMM and SCF	CFT01.2				X
PGS-0640	The PGS shall accept from the SCF new or modified Standard Product algorithms to be tested at the processing facility. This software shall be received into the test environment and shall contain the following information at a minimum : a. Algorithm identification b. Algorithm source code c. List of required inputs d. Processing dependencies e. Test data and procedures f. Algorithm documentation	IR-1: Total Applicability	CFT01.1				X
PGS-0650	The PGS shall have the capability to validate required operational algorithm characteristics prior to scheduling algorithm test time. These characteristics shall be include at a minimum: a. Language b. Operational impacts (e.g., algorithm software size, required resources) c. Algorithm documentation d. Data handling standards as appropriate e. Units and models used f. Operational compatibility g. Required metadata outputs		CFT01.2				X
PGS-0860	The PGS shall have the capability to schedule and coordinate algorithm and calibration coefficient test time in the test environment with the appropriate SCF.		CFT01.4				X

L3 Requirements to AT Test Traceability and Verification							
Paragraph ID	Requirement Text	Clarification	Test ID	Verif. Method			
				I	A	D	T
PGS-0900	The PGS shall send test products to the SCF for analysis. These shall contain the results of algorithm testing and shall contain the following information at a minimum: a. Algorithm identification b. Test time(s) c. Processor identification d. Test results	IR-1: This requirement is supported as follows: IR-1 shall provide the capability to transfer files to the SCF via ftp.	CFT01.4				X
PGS-0910	The PGS shall have the capability to support analysis of algorithm test results.	IR-1: Accomplished via comparison tools	CFT01.4				X
PGS-0920	The PGS shall have the capability to validate, through testing, that SCF processing algorithms will execute properly in the operational environment. Validation shall include final compilation and linkage of the source code and testing to verify proper software execution in the operational environment based on indicated data and test results provided by the SCF and the investigator, but shall not include scientific validation of products.	IR-1: Total applicability The Dataserver is incorporated at Release A.	CFT01.4				X
PGS-0925	The PGS shall validate algorithms used for conversions, calibrations and transformations of EOS engineering data.		CFT01.4				X
PGS-0940	The PGS shall provide storage for all candidate algorithms' software executables and calibration coefficients.		CFT01.1 (Verify available disk space)	X			
PGS-0950	The PGS shall interface to the SMC to maintain configuration control of all algorithms and calibration coefficients used in operational Standard Product production. Controlled information shall contain at a minimum: a. Source code including version number and author b. Benchmark test procedures, test data, and results c. Date and time of operational installation d. Compiler identification and version e. Final algorithm documentation	IR-1: Applies to local CM capability only, not SMC	CFT01.3				X
PGS-0970	The PGS shall provide file access subroutines that enforce compliance with the adopted standard ECS formats.		CFT01.2			X	

	L3 Requirements to AT Test Traceability and Verification							
Paragraph ID	**Requirement Text**	**Clarification**	**Test ID**	**Verif. Method**				
				I	**A**	**D**	**T**	
PGS-0980	The PGS shall provide job control routines that provide all required task parameters to the Standard Product software.		CFT02.1				X
PGS-0990	The PGS shall provide error logging subroutines for use by Standard Product software in notifying the system operators of conditions requiring their attention.		CFT02.1				X
PGS-1000	The PGS shall provide error logging subroutines for use by Standard Product software in notifying users of conditions requiring their attention.		CFT02.1				X
PGS-1010	The PGS shall provide mass storage allocation subroutines that provide algorithms with a means for dynamic allocation of storage for temporary files.		CFT02.1				X
PGS-1015	The PGS shall provide ancillary data access subroutines that provide Standard Product software access to ephemeris data (e.g., solar, lunar, and satellite ephemeris), Earth rotation data, and time and position measurement data. These subroutines shall perform operations such as: a. Interpolation b. Extrapolation c. Coordinate system conversion		CFT02.1			X	
PGS-1020	The PGS shall provide mathematical libraries including: a. Linear algebra and analysis (e.g., LINPAC, IMSL) b. Statistical calculations (e.g., SAS, SPSS)		CFT02.1			X	
PGS-1025	The PGS shall provide a Science Processing Library containing routines such as: a. Image processing routines b. Data visualization routines c. Graphics routines		CFT02.1			X	
PGS-1030	The PGS shall provide a toolkit to the SCF containing versions of the routines specified in requirements PGS-0970 to PGS-1020.		CFT02.1			X	

L3 Requirements to AT Test Traceability and Verification				Verif. Method			
Paragraph ID	**Requirement Text**	**Clarification**	**Test ID**	**I**	**A**	**D**	**T**
PGS-1220	The PGS shall have the capability to receive GFE databases and associated tools, including COTS and public domain databases, and maintain them as required as inputs to product generation: Example databases are: a. Digital terrain map databases b. Land/sea databases c. Climatology databases d. Digital political map databases		CFT02.2			X	
PGS-1315	Each PGS shall have the capacity to support I/O to temporary and intermediate storage or multiple passes over input products as required by individual science algorithms.	IR-1: Applies only to disc capacity for staging and intermediate storage, not bandwidth.	CFT02.1				X
SDPS0010	The SDPS shall provide CSMS with operational, and data processing, data quality status.	IR-1: IR-1 shall monitor the status of the Ingest and AI&T hardware.	SFT05.1				X
SDPS0020	The SDPS shall receive EOS science, and engineering data from the SDPF, and non-EOS ancillary data (as listed in Appendix C) from ADCs.	IR-1: Applies only to ingest and temporary storage for testing purposes only; data from NOAA will be via ftp of science and engineering data from SDPF, and ancillary data from ADCs (NOAA). APPLIES ONLY TO MSFC DACC AND LaRC DAAC	EXT01.1 EXT02.2 EXT03.1				X
SDPS0080	The SDPS shall archive, quality check all science data received from the EPDSs and ancillary data received from the ADCs.						X
SDPS0090	The SDPS shall interface with the PIs and the other science users to support the development and testing of data product algorithms and QA of produced data products.	IR-1: Interface accomplished only through file transfer (e.g., FTP). Accepts QA data as part of its output. Interface clarification assumes e-mail provided by DAAC.	CFT01.4				X
SDPS0110	The SDPS shall be responsible for coordination of the transfer of production and quick-look science and engineering data from SDPF.	IR-1: This requirement is supported as follows: IR-1 shall be responsible for coordination of the transfer of data from the SDPF for the purpose of testing the SDPF interface to the Ingest subsystem.	EXT01.1				X

L3 Requirements to AT Test Traceability and Verification

Paragraph ID	Requirement Text	Clarification	Test ID	Verif. Method			
				I	A	D	T
SMC-2505	The LSM shall update the system-wide inventory data base consisting of all hardware, system software, and scientific software contained within its element.		INT01.1 INT01.2		X		
SMC-2510	The SMC shall provide at a minimum system-wide configuration management for the operational hardware, scientific and system software, and the SMC toolkit contained within ECS.	CM for SS/W at sites, EDF CM for all IR-1 H/W and S/W Enhancements via Ops.	INT01.1 INT01.2		X		
SMC-2515	The LSM shall provide configuration management for at least the operational hardware, system software, and scientific software within its element and for the migration of enhancements into the operational system.	IR-1: This requirement is supported as follows: IR-1 shall provide configuration management for the Science Software at the DAACs. IR-1 does not provide an LSM.	INT01.1 INT01.2		X		
SMC-3300	The SMC shall monitor site and element hardware, and scientific and system software status to determine their operational states including, at a minimum: a. On-line b. Failed	IR-1: SNMP and COTS packages. To the extent of networks and host O/S.	SFT02.1 SFT02.2 SFT05.1 SFT05.2				X
SMC-3305	The LSM shall monitor its element's hardware, and scientific and system software status to determine their operational states including, at a minimum : a. On-line b. Failed	IR-1: This requirement is supported as follows: IR-1 shall monitor the operational status of DAAC hardware and software at the EDF.	SFT02.1 SFT02.2 SFT05.1 SFT05.2				X
SMC-3370	For each performance parameter, the SMC shall have the capability of establishing multiple levels of thresholds to include, at a minimum: a. On/off b. Pass/fail c. Various levels of degradation		SFT02.3				X
SMC-3375	For each limit checked parameter, the LSM (including those thresholds directed by the SMC) shall have the capability of evaluating multiple levels of thresholds including, at a minimum: a. On/off b. Pass/fail		SFT02.3 SFT05.3				X
SMC-3380	The SMC shall evaluate overall system performance.	Ops.	SFT01.1 SFT02.3		X		
SMC-3390	The SMC shall generate alert indicators of fault or degraded conditions.		SFT02.5				X

L3 Requirements to AT Test Traceability and Verification							
Paragraph ID	Requirement Text	Clarification	Test ID	Verif. Method			
				I	A	D	T
SMC-3395	The LSM shall generate, in response to each limit check threshold, alert indicators of fault or degraded conditions with the appropriate corrective actions.		SFT02.5 SFT05.5				X
SMC-3415	The LSM shall perform short and long-term trend analysis of element performance, including, at a minimum: a. Operational status b. Performance of a particular resource c. Maintenance activities (e.g., number of repairs per item)	IR-1: This requirement is supported as follows: IR-1 shall monitor the operational status of DAAC hardware and software at the EDF and will provide performance monitoring and Office Automation tools at the local sites. IR-1 does not provide an LSM.	SFT02.2 SFT05.1 SFT05.2				X
SMC-4305	The LSM shall maintain fault management policies and procedures for its element.	IR-1: This requirement is supported as follows: IR-1 shall support the M&O staff in the maintenance of fault management policies and procedures with Office Automation tools at the local sites.	SFT02.4 SFT05.4		X		
SMC-4310	The SMC shall perform fault analysis including, at a minimum: a. Isolation b. Location c. Identification d. Characterization	IR-1: to extent SMC-3300 is performed. To the extent of networks and host O/S.	SFT02.5 SFT05.5				X
SMC-4311	he SMC shall have the capability to perform fault analysis to the level of, at a minimum: a. Subsystem b. Equipment	IR-1: to extent SMC-3300 is performed. To the extent of networks and host O/S.	SFT02.5 SFT05.5				X
SMC-4315	The LSM shall, at a minimum, isolate, locate, and identify faults, identify subsystem, equipment, and software faults, and identify the nature of the faults within its element.		SFT05.5				X
SMC-4320	SMC shall support fault diagnosis testing to include, at a minimum: b. Resource-to-resource connectivity testing	IR-1: to extent SMC-3300 is performed. To the extent of networks and host O/S.	SFT02.5				X
SMC-4325	The LSM shall request fault diagnosis testing be performed, including, at a minimum: b. Resource-to-resource connectivity testing within its element	IR-1: b to extent of SMC-3305	SFT02.5 SFT05.5				X

L3 Requirements to AT Test Traceability and Verification

Paragraph ID	Requirement Text	Clarification	Test ID	Verif. Method			
				I	A	D	T
SMC-5320	The SMC shall establish, maintain, and authenticate access privileges for ECS scientific users.		SFT04.2 SFT04.3			X	
SMC-5325	The LSM shall promulgate, maintain, authenticate, and monitor user and device accesses and privileges.		SFT04.2 SFT04.3			X	
SMC-5330	The SMC shall provide support, manage, maintain, and request security testing that includes, at a minimum, password checking.		SFT04.1 SFT04.4				X
SMC-5335	The LSM shall perform security testing that includes, at a minimum, password auditing and element internal access/privileges checking.		SFT04.1 SFT04.3 SFT04.4				X
SMC-5365	The LSM shall generate recovery actions in response to the detection of compromises.		SFT04.4				X
SMC-8840	The SMC shall have the capability to generate detailed and summary reports indicating the performance of ground resources, including, at a minimum: c. Resource utilization	At EDF.	SFT02.3				X
SMC-8880	The SMC shall have the capability to generate detailed and summary security compromise reports indicating security compromises of ground resources and facilities, including, at a minimum: a. Security compromise type and description b. Time of occurrence		SFT04.4				X

APPENDIX B: ACRONYMS AND ABBREVIATIONS

ADC	Affiliated Data Center
AI&T	Algorithm Integration and Test
AITHW	Algorithm Integration and Test Hardware
AITTL	Algorithm Integration and Test Tool
AM	Ante Meridiem (morning)
AM-1	EOS AM Mission spacecraft 1, morning spacecraft series- ASTER, CERES, MISR, MODIS and MOPITT instruments
ANSI	American National Standards Institute
ASTER	Advanced Spaceborne Thermal Emission and Reflection Radiometer
AT	Acceptance Test
AVHRR	Advanced Very High-Resolution Radiometer
bps	Bits Per Second
CCS	Communications and Control Subsystem (NCC)
CD ROM	Compact Disk Read Only Memory
CDR	Critical Design Review
CERES	Clouds and Earth's Radiant Energy System
CFT	Component Functional Thread Tests
CI	Configuration Item
CM	Configuration Management
COTS	Commercial Off-The-Shelf (hardware or software)
CPU	Central Processing Unit
CSCI	Computer Software Configuration Item
CSMS	Communications and Systems Management Segment
CSS	Communication Subsystem (CSMS)
DAAC	Distributed Active Archive Center
DADS	Data Archive and Distribution System
DAN	Data Availability Notice

DAO   Data Assimilation Office

DBMS   Database Management System

DCCI   Distributed Computing Configuration Item

DCE   Distributed Computing Environment (OSF)

DCHCI   Distributed Computing Hardware Configuration Item

DPS   Data Processing Subsystem

ECS   EOSDIS Core System

EDC   EROS Data Center

EDF   ECS Development Facility

EGS   EOS Ground System

EITVP   EOS Integration, Test & Validation Plan

EOS   Earth Observing System

EOSDIS   Earth Observing System Data Information System

EPDS   Earth Probe Data System

EROS   Earth Resources Observation System

ESDIS   Earth Science Data and Information System

ESN   EOSDIS Science Network (replaced by EBnet)

EXT   External Interface Tests

FNL   FiNaL Analysis and Forecast System/Global Analysis (NMC)

ftp   file transfer protocol

GB   GigaByte (10^9 Bytes)

GOSIP   Government Open Systems Interconnection Profile

GPCC   Global Precipitation Climatology Center (Germany)

GPCP   Global Precipitation Climatology Project

GPI   Global Precipitation Index

GSFC   Goddard Space Flight Center

GUI   Graphical User Interface

GV   Ground Validation

H/W   Hardware

HP   Hewlett Packard

HWCI	Hardware Configuration Item
I&T	Integration and Test
I/F	Interface
I/O	Input/Output
ICLHW	Ingest Client Hardware
ID	Identification
INCI	Internetworking Configuration Item
INGST	Ingest Services
INHCI	Internetworking Hardware Configuration Item
INS	Ingest Subsystem (SDPS)
INT	Internal Interface Tests
IPT	Integrated Product Team
IR-1	Interim Release One
IRD	Interface Requirements Document
ISO	International Standards Organization
ISS	Internetworking Subsystem (CSMS)
ITs	Instrument Teams
IV&V	Independent Verification and Validation
L#	Level # (e.g., 0, 1, 2A, 3B,)
LAN	Local Area Network
LaRC	Langley Research Center
LIS	Lightning Imaging Sensor
LSM	Local System Management
M&O	Maintenance and Operations
MAC	Medium Access Control
MACI	Management Agent Configuration Item
MCI	Management Configuration Item
Mgmt	Management
MHCI	Management Hardware Configuration Item
MISR	Multi-angle Imaging SpectroRadiometer

MLCI	Management Logistics Configuration Item
MODIS	Moderate Resolution Imaging Spectroradiometer
MOPITT	Measurements of Pollution in The Troposphere
MSFC	Marshall Space Flight Center
MSS	Systems Management Subsystem (CSMS)
NESDIS	National Environmental Satellite, Data, and Information Service (NOAA)
NMC	National Meteorological Center (NOAA)
O/S	Operating System
OA	Office Automation
ODC	Other Data Center
OPS	Operations
OSF	Open Software Foundation
PC	Personal computer
PDU	Protocol Data Unit
PGS	Product Generation System (obsolete ECS element name)
PI	Principal Investigator
PI/TL	Principal Investigator/Team Leader
PM	Post Meridiem (afternoon)
PR	Precipitation Radar (TRMM)
PREREQ	Prerequisites
PRIOR	Priority
QA	Quality Assurance
RAID	Redundant Array of Inexpensive Disks
rcp	remote copy
RTM	Requirements & Traceability Management
S/W	Software
SAT	Satisfactory
SCF	Science Computing Facility
SDP	Science Data Processing
SDPF	Sensor Data Processing Facility

SDPS	Science Data Processing Segment
SDPTK	Science Data Processing Toolkit
SEQ	Sequence
SFT	Stand-Alone Functional Tests
SI&T	System Integration and Test
SMC	System Monitoring and Coordination Center
SMO	System Management Office
SNMP	Simple Network Management Protocol
SPRHW	Science Processing Hardware
SSI&T	Science Software Integration & Test
SSM/I	Special Sensor for Microwave/Imager
TA	Test Analyst
TBD	To Be Determined
TC	Test Conductor
TCP/IP	Transmission Control Protocol/Internet Protocol
TD	Test Director
TMI	TRMM Microwave Imager
TRMM	Tropical Rainfall Measuring Mission
TRR	Test Readiness Review
TSDIS	TRMM Science Data and Information System
UNSAT	Unsatisfactory
V0	Version 0 (Version Zero)
VIRS	Visible Infrared Scanner (TRMM)
W/S	Workstation
WAN	Wide Area Network

Filename: 951103.DOC
Directory: C:\LEE\MASTER
Template: C:\WINWORD\TEMPLATE\NORMAL.DOT
Title: COMPONENT ACCEPTANCE
Subject:
Author: ISYS
Keywords:
Comments: Ref: 951103.a01
Creation Date: 11/06/95 8:59 AM
Revision Number: 2
Last Saved On: 11/06/95 8:59 AM
Last Saved By: ISYS
Total Editing Time: 4 Minutes
Last Printed On: 11/06/95 11:00 AM
As of Last Complete Printing
    Number of Pages: 123
    Number of Words: 25,132 (approx.)
    Number of Characters: 143,255 (approx.)